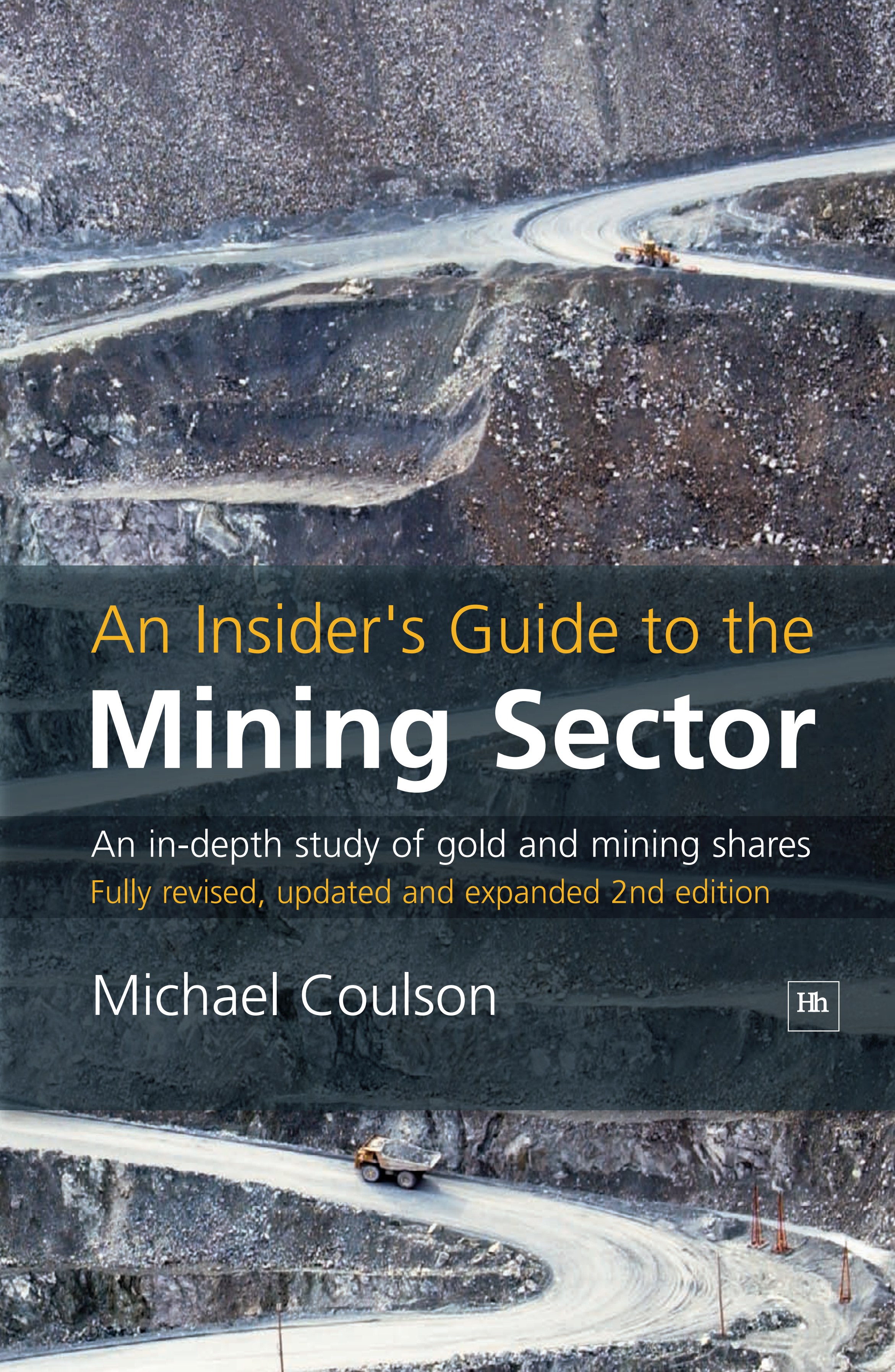

An Insider's Guide to the Mining Sector

An in-depth study of gold and mining shares

Fully revised, updated and expanded 2nd edition

Michael Coulson

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An Insider's Guide to the Mining Sector, 2nd edition

An in-depth study of gold and mining shares

by Michael Coulson

HARRIMAN HOUSE LTD

3A Penns Road
Petersfield
Hampshire
GU32 2EW
GREAT BRITAIN

Tel: +44 (0)1730 233870
Fax: +44 (0)1730 233880
Email: enquiries@harriman-house.com
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About the author

Born in 1945, Michael Coulson has been associated with the mining sector for over thirty years, although his university background is in economics where he holds a BSc from the University of London. He first worked as a graduate trainee on the legendary mining desk at James Capel in 1970, for many years the leading mining stockbroker in the City. After that he became a mining salesman at Sterling & Co and also developed the firm's research coverage of the sector. In 1973 he joined Fielding Newson-Smith (later to become NatWest Markets) as a gold mining analyst where he began a long association with the South African gold mining industry. Two years later he became senior mining analyst at L Messel (latterly Lehman Bros) where he started to produce an annual gold review which he published every year until 1991. In 1979 he moved to Panmure Gordon and in 1982 he left and joined Phillips & Drew (UBS) with the task of establishing the firm in the mining market.

After a successful four years there, where two years running he was voted No 2 gold analyst in the Extel Analysts Survey, he moved to Kitcat & Aitken where he set up a highly regarded integrated mining desk. In 1990 the firm's Canadian owners closed the firm and he was briefly with County NatWest. The following year he set up a small mining team at Durlacher, but in 1992 was back in the mainstream at Credit Lyonnais Laing where he was a salesman/analyst on the firm's specialist mining team and established an expertise in African shares. He was then approached by South African bank, Nedcor, to join a start-up broking operation the bank was establishing in London. This operation was closed in 1997 and the following year he joined Paribas to head its Global Mining Team.

He left Paribas in 2000 following the completion of the merger with BNP. Since then he has been doing independent research, mainly on a commissioned basis, primarily for small UK brokers lacking mining expertise. He is currently a non-executive director of City Natural Resources High Yield Trust and of Canadian exploration junior Moneta Porcupine.

He lives in Wandsworth with his wife and has three daughters. He has a lifelong passion for cricket and football and also enjoys a glass or two of wine sitting in his moderately well cultivated garden listening to music from another age!

Acknowledgements

This book is the result of over thirty years of following the mining sector and investing in it, both directly and for others. I have drawn upon a large number of personal experiences in describing the workings of the global mining industry and share market. Having worked at a large number of stockbrokers I have observed the sector from many different angles and worked in often quite different environments – experiencing both the often structured world of Phillips & Drew and Paribas and the far more entrepreneurial approach of Kitcat & Aitken and Credit Lyonnais Laing. Unknown to them, colleagues and friends from these days have played a key part in the writing of this book, for truly the mining sector is a global village where, whether it be London or Johannesburg, Toronto or Sydney, we participants and observers cannot help but have an impact on each others actions and attitudes both on and off the 'field'.

I would like to pay particular thanks to two people for their role in both editions of this book. My editor Stephen Eckett whose enthusiasm for the project has kept the whole show on the road. With such a wide ranging subject as mining it is easy to get sidetracked with a consequent unravelling of the narrative. Stephen's comments and advice have been invaluable in moulding the book into a coherent entity that hopefully readers will find both interesting and helpful, and his nose for data sources has led to the inclusion of more tables and charts than I had thought possible when starting out. In this particular area I would also like to thank my old colleague and friend Charles Kernot, now of Evolution, who provided invaluable help in locating many of the charts used.

Foreword to the second edition

When I wrote the foreword to the first edition of the Insider's Guide back in late 2003, I was confident that we were on the brink of a major bull market in both metals and mining shares after years in the doldrums. Michael Coulson's book was therefore extremely well timed, and also a valuable guide for investors new to the mining sector at a time when expertise in the industry amongst brokers and other investment advisers was at a very low ebb.

Since then we have witnessed a huge bull market in metals and a remarkable recovery in interest in mining shares amongst both large and small investors. Despite this, mining shares have often performed raggedly with the more speculative exploration and development sector having peaked in early 2006. Since then it has failed to match the progress made by the majors who have benefited from both soaring earnings and vigorous takeover activity. This suggests to me that the current bull market may have considerably further to run, particularly as demand for commodities from the so-called BRIC nations remains so strong.

However, the fact that major mining shares continue to sell on relatively low PE ratings and that junior mining shares struggle to attract investor interest, certainly in the UK, can only be down to a continuing lack of knowledge about the sector amongst professional advisers and their retail clients. For this reason the second edition of Michael Coulson's book is as important as the first.

One encouraging thing that I have noticed over the last year or so has been the re-building of mining coverage amongst the investment banking and broking community and we have even begun to see the reintroduction of integrated mining research/sales/trading teams, much on the lines established years ago by the mining sector's doyen, the late Julian Baring. However, it is important to note that due to the increasingly regulated securities industry little of this coverage trickles down to many investors. For them Michael's book remains a very useful tool to use when evaluating the sector and making stock choices, and his grasp of and interest in mining history provides an invaluable context to that decision making.

Adam Fleming

Chairman, Wits Gold [JSE: WGR]

www.witsgold.com

Preface

What the book covers

The first edition of this book covered those subjects that I believed were fundamental to acquiring sufficient knowledge about the mining sector to invest in it with confidence. In doing this I dipped into a wide number of subjects and tried to extract the points and issues most relevant to successful investing. Since then the mining and metals sector has experienced a massive bull market and this has led to a number of new or enhanced influences for the sector arising.

The key subjects looked at in the first edition covered the main mining countries which have listed mining companies, metals both great and small with a separate section for gold, the listed mining companies themselves from the giant diversified groups to the minnows of the exploration sector, the main mining stock markets, and some history (always important in analysing mining markets where lightening often does strike twice) including a view on the Bre-X disaster and the 60s Australian nickel boom.

This new edition brings all the above up to date, and also expands the scope of the book by looking at the growing influence of China, India and environmental concerns on the mining and consumption of metals. In terms of share markets the position of AIM versus the Canadian and Australian markets is examined in some detail and I also take a close look at the alternative investment areas of ETFs, etc. Lastly, I put the current mining bull market into context and speculate on whether we are in a super cycle for metals and therefore for miners.

The book finishes with an updated section on the main issues relating to dealing, settlement and information sources.

A word of warning

Comments and statements about such a fast moving sector as mining are often overtaken by events. It is possible that readers may spot something in the text that they think is incorrect. It may well be that when the book was published that fact/comment was correct but has been overtaken by subsequent events. The most common differences would likely be issues dealing with share prices, like market capitalisation; these figures are changing all the time and often the change is significant. The acceleration in consolidation within the mining sector can also create problems, with companies losing their independence between printing and publication.

Who the book is for

The book continues to be aimed at anyone interested in mining, and particularly mining as an investment sector. Whilst I think that the book contains material which will be useful to experienced followers of the mining sector, its main target is those who are interested in mining but perhaps not particularly familiar with the sector, and would like to know more. This means private investors, non-specialist institutional investors, generalist stockbrokers, financial advisers, and mining industry professionals.

Mining has been out of favour for many years, which has led to a sharp fall in coverage as attention has shifted to the growth sectors of technology/media/telecommunications. Over the last few years we have seen quite a sea change again, with interest in mining rising once more. However, for the moment information distribution continues to lag behind, with many brokers still not particularly familiar or comfortable with the sector. Investors will have to continue, therefore, to fall back on their own devices, surfing the net in pursuit of value enhancing information in many cases.

I hope this book will provide useful background for investors, enabling them more accurately to focus their information search and enhance their subsequent investment decisions.

How the book is structured

Whilst the book is compartmentalised to some extent:

- the first part covering **mining countries and metals** in a general sense,
- the second part **companies**, how they are valued and where they fit in the overall industry, and
- ending with the subjects of **dealing, and information sources**

there is some overlap and even repetition which is unavoidable.

The mining industry is large but at the same time compact in that it concentrates on a fairly limited number of influences. Thus the key issues facing a mining company cover:

1. the demand and price of metals,
2. the search for these metals and
3. the economics of developing and running a mine.

It is thus difficult to write about and analyse mining without jumping about between these three key elements. The base structure of the book, however, is logical and is intended to lead the reader naturally from the subject of where mining is carried on and the key metals mined, to the main markets where mining shares are traded and the kind of companies that make up the global mining share sector and how it is valued, to the final section on information sources and dealing in mining shares.

A note on currencies and metals prices

Most metals are priced in US dollars which is also often the currency of corporate earnings reports even if the reporting company is not a US company. The reader, however, should be aware that particularly where we are looking at historic events other currencies creep into the text. This is deliberate and is often as a result of the way historic information has come to me. The dollars referred to in the text are usually US, but keep an eye out for the Australian and Canadian versions. Sterling is often used in keeping with the UK's position at the centre of international mining, but the euro does not intrude very much in these pages.

As to weights and measurements, the book reflects the real world, not the bureaucrats' version, so imperial/American and metric are both used and often in the same breath. Thus, a gold mine's reserves are measured in grams per metric ton (tonne) but the gold in those reserves is valued on the basis of troy ounces. Similar examples of mixing measurements can be found with base metals such as copper, nickel and zinc.

Supporting web site

The web site supporting this book can be found at:

www.harriman-house.com/mining

Introduction

Give us the boy

It was a bright morning in early 1971. I had been seconded as part of my graduate training course at London stockbrokers James Capel to assist on the mining desk, having expressed an interest in becoming involved in international securities rather than the domestic share market. As the Jesuits say, give us the boy and we will have him for life. My lifetime addiction to mining began that spring day.

As a trainee I was not expected to arrive at the same time as the department, trainees have a way of getting under everyone's feet and their absence is seldom regretted. As I opened the mining department door that morning I was met by a scene of pandemonium. The mining desk stretched across the institutional equities department, and was open on one side to the desks of the UK institutional salesmen. On the other side there was a floor to ceiling partition, on which the mining share prices and dealing boards were fixed, separating the mining sales desk from the specialist mining research group who beavered away behind the partition. I looked down the desk at gesticulating arms and waving telephones as the mining sales team urged their clients into action.

At the end of the desk on the left against the window which overlooked the eastern end of London Wall sat Shane Norman, assistant to the Mining Partner, Julian Baring, who was on his right. Latterly, Baring was to become the City's leading gold guru, first as a broker and then as a fund manager. Next to him sat Andrew Malim and next to Malim was Peter Bugge. On the other side of the desk was David Dugdale, part-time mining dealer later to become managing director of James Capel following its *big bang* takeover by HSBC. Next to him sat Mike Bevan, senior mining dealer, who, that morning, had yet to go down to the Stock Exchange floor, so frenetic was the dealing on the desk. Next to him was Alan Robinson booking the deals. My seat was next to Alan in the corner opposite Shane Norman and Julian

Baring. Behind the partition, analysts Bill Anderson and Harry Hake beavered away. In those very early days of specialist sector coverage in London, James Capel's mining team was a large and formidable entity.

That morning Ashley Down, the Australian Partner, was on the mining desk as well, for what I was witnessing was the announcement of the Agnew nickel find in Western Australia by UK mining groups, Selection Trust and CAST. Agnew turned out to be the last lash in the tail of the Australian mining boom which had started with the discovery of nickel at Kambalda in Western Australia in 1966 and peaked with the Poseidon nickel discovery in 1969. Unfortunately, due to then tight Australian exchange controls, Australian investors were frozen out of Agnew, but UK and Continental investors were having a ball that morning.

For a relatively young and certainly impressionable trainee on the first rung of a stock exchange career the Agnew discovery was heady stuff and confirmed the attractions, albeit it in a superficial way, of the mining sector. Overnight the prospects of two mining groups had been potentially transformed by a major minerals discovery. Of course the effect of such a discovery on Selection Trust and CAST, who already had significant sources of mining earnings, would have been less than say its effect on a 'penny' stock like Poseidon, whose earlier nickel discovery had propelled its share price from 6 old pence (2.5p) in 1968 to over £120 in early 1970. However, the excitement of mining with its hope of instant riches was addictive.

Beyond speculation

But if the prospect of instant riches gave the mining sector obvious glamour, I rapidly discovered that it had other attractions, and pitfalls, as well. Attitudes towards investment in industrial equities can change markedly over time, the bulls of the late 60s were followed by the bears of the mid 70s, who in due course were followed by the bulls of the late 90s replaced in their turn by the post-IT boom bears of the new millennium. Against this background the mining sector can provide some counter cyclical relief, the major boom in South African gold shares in the 70s followed on nicely from the nickel boom and gave some protection from the ravaging of world equity markets in the wake of the 1973 oil price shock. Here the attraction was less in the discovery of new mineral deposits and much more in the prolonged surge of the gold price, which transformed the outlook for the gold mining industry and its earnings and dividends.

Whilst the speculative attractions of mining share markets are, therefore, easy to appreciate, the size and importance of the worldwide mining industry should not be ignored either as that gives the sector its underpinning. Although there are still a number of state mining companies the industry is heavily in private hands, and many producers are publicly quoted. The industry itself is widely spread round the world and no continent or island, however small, is without a minerals operation even if it is only a basic small stone quarry.

However, mines also are controversial due to their impact on the environment; a deep level mine may be inherently dangerous to work in and an opencast mine may be viewed as an unacceptable scar on the landscape. The degree of disapproval will also vary, with Africa less likely than the western USA to create difficulties for new mine developments.

The current mining boom

There were those who believed that mining was an old industry with limited attractions, if any at all, for the modern investor. A widespread view as the twenty-first century dawned, and the TMT boom reached its peak. Indeed, mining has often been written off as a sunset industry; it hardly rated a mention in the early 60s as a previous high technology boom unfolded. Yet, as we saw above, that decade ended with one of the century's greatest stock market booms, in Australian mining shares.

It is, however, true that mining struggled with the technological revolution, and metals, as a component of economic growth, have lost ground as the knowledge based economy has overtaken the raw material based economy, particularly in the advanced world. Having said that, the rising economic power of China and India and the still relative poverty of their people is changing all that, raw materials, the bedrock of both basic industry and social infrastructure, have clearly not had their day even though the real price of metals has tended over the longer term to fall, although this is not a straight line process, as the inflationary 70s showed.

As an investment proposition the mining sector has waxed and waned with regularity. It is interesting to note that institutional portfolio weightings for mining shares in mining countries such as South Africa, Australia and Canada can still be below their correct weighting in market capitalisation terms, although the China story and the rise of tracker funds may be slowly changing this. In the UK some general stockbrokers see the sector as difficult to understand, both on a macro and a micro level, although the rising importance of mining companies in the FTSE 100 is having some effect on their attitude. The fact that some of the best mining shares are foreign listed and have to be dealt and settled overseas is another check on their enthusiasm. However, dealing in overseas mining stocks did not trouble Julian Baring and the James Capel mining team, or indeed rival mining teams, in the 70s and 80s, and foreign dealing to this day remains relatively straightforward despite reductions in settlement periods.

A global business

Whatever reluctance stockbrokers may have in dealing in overseas mining shares, it is important for investors to see mining shares as inhabiting a truly global sector. Much is made today of looking at market sectors on a regional basis rather than just a narrow national one. The phenomenon of Europe-wide sector research and dealing is well established, but the imperatives of national economic trends have an irritating way of reasserting themselves. For mining the global picture is paramount – a gold mining company may have operations in half a dozen countries but the market and price for its product is international, homogenous and largely unaffected by local considerations. Even those other great international leviathans, the oil majors, can find downstream profitability materially affected by local conditions.

Mining, then, is an industry which requires an international outlook from investors. An open and enquiring mind is essential and in order to make informed judgements about investment possibilities a wide body of knowledge about the world is essential. Many people make the mistake of thinking that the mining sector is difficult because it requires technical knowledge of the industry itself, and unless one is familiar and comfortable with engineering and geological concepts one is bound to flounder. Although it is true that some knowledge of the *mechanics* of mining is needed in reviewing mining investment ideas, understanding of both macro and micro economic trends which drive the demand for, and price of, metals is equally important.

Perhaps one of the most compelling things about mining is that it forces us to open our eyes to the world. It is rewarding to specialise in one country's mining industry as I did with South Africa, and in doing so become familiar with a country that in my youth I had had no contact with and knew very little about. But mining is a global business and to engage successfully with it, investors and analysts must acquire a catholic attitude. That is why, certainly in the past, UK mining analysts and investors were held in such high esteem, their global outlook and understanding being in often stark contrast to the parochial attitudes of many of their overseas peers. But if the mining sector's global focus has been educational and rewarding, on a more basic level the sector has been (indeed still is) enormous fun to follow and invest in. I hope this second edition reflects that and also provides some thoughts as to how this fun can be turned to profit.

1. Industry Background

We start the book with a broad look at the worldwide mining industry, looking first at those countries that historically have always had a substantial private mining sector and listed mining companies.

Whilst the leading mining groups are still to be found in the old 'English speaking' markets, recent years have seen the flotation and/or listing of mining companies from Kazakhstan, China and Russia. In the case of Kazakhstan many of the listings have been in London and the companies have incorporated in the UK, a phenomenon I will be looking at in more detail later. China and Russia have also part privatised a number of their larger mining companies which have their primary listings in their home market, and in the case of China in Hong Kong also; smaller mining companies active in the two countries tend to be foreign registered and foreign listed.

Mining countries

As I have said there is scarcely a country in the world that does not have some semblance of a mining industry, even if it is no more than a chalk quarry or a sand and gravel pit. However, the number of countries with substantial mining industries is more limited, and not all of those would be considered ideal environments for investors.

From the perspective of the investor familiarity is a good starting point, and that can cover a number of issues including language, legal integrity, environmental constraints, economic policy and political prejudices. If one looked at the portfolios of the bigger specialised mining investment funds one would find that the majority of stocks held still come from a very limited number of countries, primarily:

- Australia
- Canada
- South Africa
- UK
- US

The question of location

Here, we define the *country of origin* as where the mining company has legally incorporated itself. Following the demise of its coal industry the UK is no longer an important mining country, but four of the world's largest mining groups (Anglo American, BHP Billiton, Rio Tinto and Xstrata) are incorporated in the UK.

Part of the reason why the majority of mining stocks came from a very limited number of countries is the historic structure of many mining industries which were formerly owned and run by the state, and have only recently entered the public domain following privatisation in the last ten years or so.

Of course a mine is where you find a mineral deposit, unlike a factory which can be put up in the most beneficial location. This means that many mining companies from, let us call them, the big five countries, operate outside their geographical incorporation. Although Chile is a large producer of copper, few funds would buy a Chilean mining stock direct even if they could. Rather, they are exposed through holdings in major groups such as Antofagasta and Rio Tinto which have substantial operations there. This is repeated in other Latin American countries, in Eastern Europe and in the old Soviet Union countries.

Having said that, locally incorporated stocks such as Buenaventura in Peru, Grupo Mexico, Vale (the former CVRD) in Brazil, KGHM in Poland and Norilsk in Russia are frequently to be found in foreign portfolios. It is likely that this trend will continue as local stock exchanges and capital markets gain both financial strength and recognition. This could well lead to mining companies in these markets using their own paper to make overseas acquisitions, rather than as at present paying cash – CVRD's takeover for cash of INCO for example. As the number of large mining companies in the major markets shrinks under the current and continuing wave of bids and mergers, investors may in any case find themselves looking at these less well established exchanges for opportunities.

Australia

For many older investors Australia, as far as mining is concerned, conjures up the image of free booting entrepreneurs pushing prospects and projects at unsuspecting punters, an image heavily influenced by the nickel boom of 35 years ago. Even in today's heavily regulated markets, the Australian mining industry still creates larger than life characters – Canada has also done well in this regard in recent years.

Australia has a long history of mining and because its economy is relatively small, particularly when compared to its mineral output, it has always been a large exporter of its mineral production. Historically, its customer focus used to be the old world of Europe, but over the last 30 years it has increasingly supplied the rapidly growing industries of China, Japan and the Far East. Although Australia is one of the most stable countries in the world in economic and political terms, operating there, nonetheless, has not always been straightforward and even today investors need to keep their eyes open.

The British connection

Like South Africa, the early days of Australian mining, particularly the great Western Australian gold rush of the late nineteenth century, were heavily financed by British investors. As Australia did not become a free governing Commonwealth until 1901, and only in 1942 gained full autonomy from the UK in both internal and external affairs, this financial link is not surprising. It also means that there are established conduits between the UK and Australia for share dealing, although it can be argued that these were allowed to get 'rusty' in inactive periods such as the 90s. British investors historically are comfortable with Australia, and the so-called Poseidon nickel boom of the late 60s still retains its fascination to this day.

The record of the country in developing its mining industry over the relatively short period from the early 60s to the mid 70s is impressive, adding further support for investor interest. In that time Australia discovered and developed a huge bauxite/alumina industry, the world's largest iron ore export industry, a major new nickel province, large oil and natural gas fields, and a number of huge uranium deposits.

The 70s saw a growing independence

The 70s were years of change around the world and in the wake of the Vietnam War a new radicalism arose. In Australia it swept away the cosy relationship with Britain which had existed for decades, and was critically assisted by British entry to the European Common Market. Australia turned instead to its own back door, the Far East, and historically a proud nation it also adopted a more nationalistic approach to its commercial relationship with the rest of the world. This was in part stimulated by the election of a radical Labor Government in 1972.

A number of actions flowed from that political event, including restricting foreign ownership of an Australian company's share capital to no more than 40%. Historic relationships like Rio Tinto and CRA, Rio's listed Australian subsidiary where Rio had an 81% stake then, were allowed to continue, although a reduction over the medium term was expected.

The problem of uranium in the 70s

However, bearing in mind the massive growth in mineral output over the previous decade, a major concern was raised by the attitude of the new Labor Government to the development of Australia's new uranium deposits. The green light had already been given to the Ranger project in the Northern Territories but Pancontinental Mining had discovered an even bigger deposit at Jabiluka nearby. There had been a number of issues regarding the deposit's proximity to a national park and the importance of the area to aborigines due to sacred sites, and these problems were eventually ironed out. However, Labor were implacably opposed to nuclear use in the weapons and energy fields, and refused permission for Jabiluka to proceed. Although in due course uranium export restrictions were eased and much work was done over the years on Jabiluka, no uranium was ever commercially produced due to environmental pressure and, eventually, a deteriorating market for the mineral did for the project.

Nationalistic, environmental and ethical issues have been an important part of the Australian mining scene ever since, although Liberal Governments have tended to be more accommodating than Labor over minerals policy. Today, foreign ownership is no longer the burning issue that it became 30 years ago and the 40% rule is long gone. Canada's Placer Dome, for example, was able to acquire Aurion Gold in a disputed takeover in 2002 without any government comment or action. More recently, Xstrata acquired MIM and BHP Billiton took over WMC without any great to-do. Perhaps the latter deal also benefited from the fact that the acquirer could be counted as a local company. This derived from the very diplomatically handled merger between Australia's natural resources giant BHP and Billiton of the UK, which led to an unusual corporate structure that effectively meant the merged entity was one company with two incorporations – Australia and the UK. A similar situation arises in the case of Rio Tinto, which complicates the disputed BHP takeover bid for Rio.

The aboriginal rights issue

One continuing issue facing investors looking at Australian mining is aboriginal rights. The official term is *native title*, and it seeks to confront the situation where a company, following a successful exploration programme, wants to develop a mine on a particular lease. Until the question of native title has been dealt with no development can proceed. Aboriginal leaders and their advisers can claim that the ground on which the company seeks a permit to develop a mine has historically been used by Australia's native people (the aborigines). This then requires that they be offered compensation for the loss of their rights, or *in extremis* that permission be refused for a development. It goes without saying that investors need to establish the native title position if they are interested in the prospects of a particular exploration company.

As labour costs in Australia are high this tends to mean that mining operations are capital intensive with consequently small workforces. The highly mechanised iron ore operations in the Pilbara in Western Australia are a case in point. These are huge open pit operations, with massive trucks lifting the ore which is loaded directly or via a beltway onto some of the longest goods trains in the world. These take the ore to port where it is loaded via another beltway directly onto large ore carriers. Similar large scale mines, such as in the coal and bauxite industries where mining techniques bear more than a passing resemblance to earth removing, are typical of the Australian scene.

Although the issues of the environment and aboriginal rights are delicate ones, Australia is a huge country, a continent indeed, with a relatively small population lives mainly around the long coastline and in the central/south eastern corner of the country. This means that a huge empty and accessible interior with high prospectivity for mineral discoveries underpins the mining industry.

Canada

Despite its strong historic links to the UK, it has been the case for many decades that Canada, in economic terms, has been primarily influenced and dominated by the US. Conversely, it is also the case that today Canadian mining groups, particularly in the field of gold mining, have a powerful leading position in US mining, and we will hear more of this later. Canada, due to this US influence, was never a member of the Sterling Area, unlike Australia and South Africa. When UK exchange controls were tightened due to the Second World War and its aftermath, capital was still allowed to flow within the Sterling Area, although it was tightly restricted outside including Canada.

The influence of the US

Canada is often thought to be highly sensitive of its proximity to its giant neighbour. It is certainly aware that it is not very high in the thoughts of US citizens. This was demonstrated by a poll commissioned by Toronto's Globe and Mail in the late 80s, where well over half the US citizens approached had difficulty either positioning Canada or correctly answering the most simple questions about the country. However, US mining share funds are very much more in tune with what makes Canada tick and have significant stakes in most of the leading Canadian miners, particularly in the gold area. Neither does this seem to worry Canadians unduly, perhaps because they realise the important stakes their companies hold in the US mining industry.

Like Australia there has always been a strong junior mining sector in Canada which provides essential seedcorn capital for exploration. However, Canada is in certain respects a mature minerals province, and its major base metal operations such as nickel and zinc tend to have been established for many decades. Many of its gold mines are also mature but the industry has a strong reputation for finding new ore in traditional gold camps as has happened at Red Lake and Timmins in Ontario. Neither has the Canadian mining industry lost its ability to find entirely new mineral provinces, as has been demonstrated by the discovery of diamonds in the North West Territories in the 90s, setting off a frenzied if relatively short-lived stock market boom. The discovery of a brand new nickel province in Labrador in the same decade was an additional demonstration that Canada was not dead ground as far as exploration went, even if many Canadian companies were concentrating their efforts overseas.

The 90s saw success with aggressive financing, but then Bre-X

It was also the case in the 90s that Canadian investment banks and brokers, encouraged by exploration successes in the junior sector like the diamond discoveries, established a reputation for aggressive fund-raising on the sector's behalf. How much of this money was actually raised from Canadian investors is open to question, and there are those who claim that most of the mining capital was raised in the US and Europe by the overseas branches of Canadian brokers. Whatever the truth, none of this activity did the Canadian mining industry any harm until the Bre-X scandal – which we will cover in detail later in the book – ruined everything. After Bre-X, Canadian brokers and even the Canadian mining industry had to struggle hard to persuade investors that the sector has not reverted to wild west status. In recent years they have had marked success in re-stimulating overseas interest in Canadian mining companies.

South Africa

Whilst South Africa with its new democratic dispensation is now viewed as a legitimate investment destination for investors, the years of apartheid stretching back to the late 40s saw the country shunned by many funds. Some people went to considerable lengths to express either their disapproval of the regime or their lack of enthusiasm for investment in such an unstable environment. One of the more startling statements was that made by the UK-based African mineral explorer, Reunion Mining, who on the cover of its 1991 annual report featured a tracing of the African continent with South Africa completely cut away.

Others were not so squeamish, for the country dominated world production of gold and platinum and controlled the diamond industry. In the inflationary 70s and early 80s these were critical metals and minerals to be exposed to. Today, South Africa remains a key player in all these precious metals and minerals, but the most powerful mining group in the country, Anglo American, has relocated to London and over the last 20 years other countries have expanded gold production as South Africa has fallen more than two thirds. There are also new international players in diamonds following the discovery of economic deposits in Canada, and the fall of the Soviet Union which led to changes in the industry there. For platinum there remains no viable alternative in terms of country.

However, the desirability or otherwise of investing in South Africa remains in dispute even though apartheid has been dead for over 10 years. In recent years the South African Government has ruled on three particular areas of material interest to the mining industry:

- mineral leases,
- black empowerment, and
- mineral royalties.

Mineral leases

The issue of mineral leases caused some controversy as the Government was seeking in effect to nationalise them; its prime aim being to stop companies acquiring freehold leases and then not working them thereby completely anaesthetising any minerals that might lie on the property. Although there were concerns that this added up to backdoor nationalisation of the industry, the Government preferred to see its policy as promoting the concept of *use it or lose it*. In the aftermath of the adoption of the policy a significant number of dormant mineral leases have been re-assigned, often to smaller mining companies, leading to the development of new platinum, diamond and gold operations over the last few years. The issue of leases in terms of the outside world has been less controversial as most countries with mining industries vest mineral leases in the State, and operate on the basis of granting these leases for exploration and development.

Black empowerment

Black empowerment is a highly sensitive political issue and one which the Government is pushing very hard. The idea is that in order to right the wrongs of the apartheid era, previously disadvantaged groups, primarily but not exclusively blacks, must be given assistance so they can participate in the mainstream economy. This policy is not only aimed at the mining industry, and indeed now affects decision-making in all parts of commercial and public life. The mining companies have in a number of instances been commendably quick to construct black empowerment deals. These usually take the form of either joint ventures with black groups or selling mining assets to black businesses. In the course of this a number of new mining companies have sprung up, ARM, which amongst a wide portfolio of assets has a 16% stake in Harmony Gold, is probably the best known.

However, there are a number of problems associated with these deals. The main one is the question of how they are financed, as many of the interested groups do not have the resources to make straight asset purchases. The most usual route is for the empowerment group to borrow money to make the purchase, using the cash flow from the asset to pay interest and principal. The Mining Charter, which refines the principles of empowerment as they relate directly to the industry, lays down percentages and timescales for direct black shareholdings in mining operations, ultimately by 2014 companies will need to show 26% ownership of themselves or their operations by so-called black empowerment groups. Unfortunately there has been some confusion over whether companies get a credit towards the required percentage for group assets already sold to empowerment groups before the Mining Charter came into force. AngloGold was one company with a problem in this area, as it had done a number of empowerment deals primarily by selling assets to ARM, but had no current disadvantaged shareholding in the group itself. The asset sales to ARM in fact have been retrospectively counted as a BEE deal and AngloGold has also distributed equity to its primarily black workforce in South Africa to reach the 26% level. The pity of black empowerment is that there are not more deals where either workers or other grassroots black interests have been allocated or acquired equity in mining assets. The deals done have tended to be with established black business interests and the whole BEE process has ended up with more than a passing resemblance to that which enriched the Russian oligarchs.

An adjunct of black empowerment policy is the Government's growing desire to see more of the value added from metals and minerals accrue to the local economy, boosting employment and generating revenues both for the government and for local companies. This is by no means an ambition unique to South Africa and many countries have aspirations to move beyond being merely producers of raw materials to being producers of finished products and even goods. The South African government has begun to take action in this field and its first target has been the diamond industry where it has sought to greatly expand the local sorting, cutting and polishing industries at the expense of the established structure which places most of this activity in Europe. Only time will tell whether this development, with its disruption of traditional business practices, achieves its aim of boosting local economic enterprise. It would be no surprise to see more of this restructuring spreading into other metals over the next few years, although shortages of skilled labour may rule the pace of the process.

Mineral royalties

As far as the issue of mineral royalties goes, again, as with the introduction of State mining leases, nothing unusual is proposed as the practice is widespread throughout the world, although Chile and Canada's are based on profits not turnover. Indeed, in the past the South African gold mines used to have to pay a lease payment although this was based on a formula linked to profitability and this payment was allowed against income tax. The latest draft shows that royalties will be based on earnings before interest and tax with annual capital spending allowed fully as an expense. The royalty will have a cap of 5% for refined metals and minerals and a 7% cap for unrefined. The actual rates are expected to be between 1.7% and 2.5% for gold and 2.2% to 3.3% for rough diamonds, for example. The original royalty proposals were based on revenue, irrespective of profitability, and could have severely damaged mining development in South Africa where the industry is suffering from high fuel costs and power shortages.

A few years ago the threat of private legal action arose in the US aimed at major international companies with big South African operations such as Anglo American who were thought to have benefited from the years of apartheid. This may well have been stimulated by the Truth and Reconciliation Committee's (TRC) announcement in early 2003 that a system of reparations should be put in place to compensate victims of the old regime. Whilst the TRC's action was aimed at any company that was thought to have made money out of apartheid, mining companies were clearly the main target. The TRC has now closed down, its work finished. Any further move on the issue of reparations is now in the hands of the SA Government, which is showing no enthusiasm for taking action; nothing has been heard from the US action groups for some years.

Power problems

In early 2008, production at the country's largest gold and platinum mines was temporarily suspended due to power cuts. This was a result of years of under-investment by state power company Eskom. This is likely to remain a problem in the near future. It could also affect other countries, as South Africa supplies electricity to Zimbabwe, Zambia, Botswana, Mozambique and Namibia.

USA

No longer a growth mining nation

The US can no longer be viewed as a dynamic mining nation, certainly as far as output growth is concerned. As one of the earliest countries to embrace the industrial revolution it developed its mineral resources quickly in order to provide its own raw materials to feed plants and factories. Today the country remains a major producer of coal, copper, gold and other metals. However, a combination of very tight environmental legislation and the fact that the most attractive sources of metals have already been exploited means that interesting investment opportunities in the US mining industry are less available than in Africa and Latin America. Neither are the US incorporated diversified mining companies large by the standards of the UK giants, with the exception of Alcoa which is more of an integrated aluminium group than a mining company, coal groups like Peabody, and Freeport-McMoran after its recent takeover of Phelps Dodge. Newmont, which was once controlled by long departed UK gold miner Consolidated Gold Fields, is one of the three largest gold mining groups in the world by market capitalisation.

Increasing ownership and control by foreign companies

A measure of the fall from grace and influence of the US mining industry is the fact that the once mighty lead/zinc group, American Mining and

Smelting (AMS), is now owned by Grupo Mexico, and the country's only serious platinum group metals producer, Stillwater, is 55% controlled by Russia's Norilsk. This emphasises the point that if US investors want to benefit from a metals and mining share bull market they are forced to look to overseas markets and stocks. Because of this, many overseas mining groups now have their shares listed in New York to facilitate trading by American investors. Nonetheless, when one sees US ownership, and therefore influence, in such an important industry as mining at such modest levels, it underlines the shift in the world's largest economy away from heavy industrial manufacturing.

Having said all this there is still, as mentioned above, significant metal output coming from the US but a growing amount of that is under the control of foreign groups like Rio Tinto of the UK. It is also interesting to note the prominence of foreign groups in what once would have been a highly strategic part of the mining industry – gold. Here, the Canadians are particularly strong with companies like Barrick, Goldcorp and Kinross having substantial gold mining operations in the US. Investors looking for exposure to the US mining industry will therefore in the main have to look to non-US incorporated mining companies for this.

The attraction of the US to investors generally is the robust approach to business of US companies; and the perception that business in the US operates in a much more friendly environment than it does in the heavily regulated European Union or structurally challenged Japan. Whilst there is something to this, certainly as regards sunrise industries such as technology, the picture is less clear as regards the exploitation of minerals. Many states have very strict rules regarding the environment, particularly where pollution may be a particular hazard often as a result of mining companies' actions in the past. The collapse of Galactic Resources in 1992 and the serious pollution caused by the bursting of its Summitville slimes dam, left the US state of Colorado with a huge clean up bill. In the light of that incident, as well as the growing inheritance of polluted mine sites in the US following operational closure, environmental laws were materially tightened.

United Kingdom

Little mining activity left

One of the most interesting business developments in recent years has been the relocation to and re-incorporation in the UK of a number of major mining companies. This has meant that four of the largest mining companies in the world – Rio Tinto, Anglo American, Xstrata and BHP Billiton – have UK incorporation; all are part of the FTSE100 share index. It is important to appreciate, however, that any UK mining operations that these companies have are very small. Indeed, mining in the UK is itself confined to speciality minerals such as china clay, sand and gravel and a rapidly contracting (though once powerful) coal mining industry.

The financial attractions of London

Therefore, with little mining activity in the UK the reasons for the presence of these companies in London is primarily financial. The banking system is seen as sophisticated and experienced in financing mining developments. Operating as a UK company means that the cost of capital can be much lower than in countries like South Africa. The historic links between the City of London and the mining industry mean that there is understanding of the risks and rewards of financing mining companies. When UK exchange controls were swept aside in 1979/80 the equity market was once again able to look to British institutions and private investors to finance mining companies as they did in the nineteenth century at the height of the Empire. There was also a ready built expertise in the stockbroking community, which curiously was developed in the years of exchange controls primarily to service more fortunate investors in countries such as Switzerland which had no controls. How extensive that expertise is today is less clear and we will be considering that issue later. The existence of tax treaties, avoiding punitive double taxation implications for mining companies incorporated in the UK and operating elsewhere, is also helpful.

The revival of the UK mining company sector is also interesting when one remembers the decline that had set in by the 1960s. In the early part of that decade, two South African groups, Johannesburg Consolidated and Union Corporation, moved management and control from London to Johannesburg. In the early 70s, New Broken Hill, a UK company with Australian base metal interests, also re-incorporated in Australia. Before that, in the 50s, London based African copper mining companies like Bancroft, Rhokana and Rhodesian Anglo American, which latterly became Minorco, had moved control to the then Northern Rhodesia which gained independence as Zambia in the 60s. In the 70s many of the London based Malaysian tin mining companies also upped sticks for the Far East.

By the 70s the remaining UK mining houses consisted of RTZ (now Rio Tinto), Consolidated Gold Fields (eventually taken over by Hanson and broken up), Selection Trust (taken over by BP as big oil diversified into mining) and Charter Consolidated (Anglo American of South Africa's offshore mining arm now metamorphosed into an engineering conglomerate). Other smaller UK incorporated mining companies included Consolidated African Selection Trust (quickly swallowed up by parent Selection Trust), Lonrho (more an African conglomerate until the non-mining interests were split off in the late 90s) and London, Australian and General (a South African based mining group controlled by financier Oliver Jessel).

The 90s saw the rapid recovery of the mining sector

By the early 90s the UK was down to Rio Tinto as its sole major mining group, and the relevance of London as a mining centre had all but disappeared. Since that time a remarkable transformation has occurred that has led to the establishment of three further UK mining groups alongside Rio Tinto, all large enough to be constituents of the FTSE100. In addition, Antofagasta, which had been a small capitalisation South American based railway company, is now a substantial and growing producer of copper in Chile and also a FTSE100 company, and Lonmin (formerly Lonrho), and also in the FTSE100, is one of the platinum industry's 'big three'. Some newcomers have not come fully into the UK but incorporated in the UK's offshore islands with a London market listing, West African gold company Randgold Resources, a Jersey company, is a substantial example of that.

The rapid recovery of the London mining sector in recent years is further underlined by the rise in the number of foreign mining companies seeking admission to the Alternative Investment Market (AIM), either to achieve dual listing alongside their home exchange or to relocate to the UK. Although this trend can be seen as support for London's rising reputation amongst foreign mining companies, the actual price performance of a number of the companies listed has been poor.

On the whole the UK currently has few problems for investors, although that has not always been the case – as those with memories of the often desperate 70s will know. However, since UK mining companies largely operate overseas the issue of country risk is one that still has to be evaluated. It is, therefore, helpful that the major UK mining groups have at least some geographical spread. Anglo American, with around 50% of its operating profits still coming from Africa and South Africa, is the most focused, Rio Tinto with its broad spread of interests is the least focused from the country risk angle. The smaller companies are unsurprisingly less broadly spread.

Kazakhstan comes to London

Borat is not the only Kazakhstani who has taken a shine to London! One of the more unusual trends that has sprung from the current mining bull market has been the flow of essentially Kazakhstan companies that have decided not only to obtain a listing on the London Stock Exchange, but have incorporated in the UK and are thus qualified to be included in the FTSE indices – in the case of copper miner Kazakhmys even making it into the FTSE 100 and along with Eurasian Mining in due course. This mimics the incorporation in the UK of companies primarily operating in Britain's dominions and colonies in the nineteenth and twentieth centuries. At one time many South African mining companies in particular were incorporated in the UK as mentioned above. The difference with Kazakhstan is that it has few if any historic links with the UK, having been under the thumb of Russia for centuries. The reason for the rash of Kazakhstan companies coming to London is that the UK market has both the expertise and capacity to raise substantial amounts of capital for these ones, particularly the mining companies, and also has the required sophisticated investor base to subscribe for equity stakes and offer a liquid secondary trading environment.

The risks of the stans

But, whilst being flattered by this, foreign investors, both UK and others, need to be wary. Particularly in the field of oil and gas there are signs that the Kazakhstan government is seeking, like Russia, to make sure that it is in charge of the development process and thus is changing earlier agreements often on environmental [sic] grounds. It is also seeking to materially expand its uranium industry. If the government in due course begins to see the mining industry in a similar light, the fact that companies are incorporated in the UK is unlikely to cut any ice. Oxus Gold's shareholders have already been victims of a state grab by the Uzbekistan government for instance, and Oxus has also fallen foul of the Kyrgyzstan government, which has also seen UK minnow Palladex quit its 'shores' for Africa.

There may have been much excitement over the mineral potential of the 'stans', but this potential, which is very real, is not without risk, and this should not be ignored. In the 'stans', corporate governance is a very new and even alien culture, and countries like Kazakhstan are potentially rich enough to take a relaxed view of the concept. There are also other issues to bear in mind, such as local stock markets, which are currently small and illiquid but in due course governments may well want to promote them and this may well lead to conflicts with UK incorporated Kazakhstan companies, particularly in the sensitive area of natural resources.

China

The increasing influence of China in world commodity markets has been one of the most potent economic stories of the past five years. China's, at times, insatiable demand for raw materials has driven both demand for and the prices of many metals to record levels as industrialisation and urbanisation has stimulated the country's double digit growth rate. The consequent strength in raw material prices has proved a bonanza for overseas mining companies and has been a key factor, not only in exploding earnings and rising dividends, but in underwriting the massive increase in corporate activity in the global sector.

Extraordinary growth and transition

The rising economic power of China, and its current social and economic backwardness, guarantees that it will be a huge and growing consumer of raw materials at all levels. It is an enormous influence already on the world commodities stage and is working hard to secure a long-term position in key energy, metals and soft commodities. To this end it has launched a major effort in Africa and Latin America. In this, there are very strong echoes of the Japanese strategy of the 60s and 70s. However, unlike Japan, it already is a major supplier of these raw materials from its own resources and this is likely to grow materially over the longer term. The shorter term problem for China is that the country's ambition for superpower status can only be achieved by perpetuating the current rate of economic growth well into the future. This means that at the moment China's raw material needs can only be fulfilled by continuing substantial imports. Also, since what was once a largely agrarian society is rapidly becoming an urban society there is a major one-off shift from small scale self-sufficiency living to a more modern urban consumer lifestyle. This can only keep up the pressure for raw materials at all levels.

China then is a juicy investment opportunity. However, it ought not to be forgotten that not so long ago it was an inward-looking, communist state where the economy was controlled by the government and there were few opportunities for private enterprise, and almost no opportunities for foreign investors. The country remains politically undemocratic but it has unleashed at the economic/financial level a veritable tiger in the last decade or so. In doing this it has created an extraordinary hybrid: part raw-in-the-tooth capitalist and part repressive communist state. There are those who believe that the rapid expansion of a wealthy middle class will inevitably lead to a more democratic political system. This is an uncertain proposition, but there is little doubt that pressure for political change is likely to intensify over the next decade or so. However, those who remember Tiananmen Square know that events in China can take an unfortunate turn.

For investors, China really is a new frontier and those looking at the stock market there, although perhaps comforted by the fact that there has been a massive explosion in the number of private Chinese stock market investors over the last few years, must be aware that after WWII and the rise of communism, private property and investments were subject to wholesale expropriation without compensation. Because China has become such a massive holder of foreign paper due to its huge accumulated foreign currency reserves and is increasing its investment outside China at the same time, unilateral action against foreign investors at home seems unlikely. But as I intimated above, events in China do not always unfold in a comfortable straight line.

How best to gain exposure

China is a country with great investor potential but it is not a western democracy and investors are unlikely to be able to rely on the protections common in western markets. So, since there are many other ways of playing the commodity sector, is it wise for investors to become involved directly in China? Whilst China has contributed hugely to the mining sector's prosperity, this has largely been to the advantage of companies from outside China. A prospective foreign investor in Chinese mining situations is considerably more restricted than if his interest had been in Australian or Canadian mining. In the main the Chinese-orientated miners, which currently attract foreign attention, are juniors incorporated outside China and listed in foreign markets such as AIM and the TSX Venture Exchange. There are a growing number of Chinese incorporated and locally listed mining companies, but foreigners can only currently invest in those which are traded in Hong Kong (H shares) or have ‘B’ share status on the Shanghai and Shenzhen exchanges. In addition there are ‘N’ shares which have New York listings. This is both a growing and a fluid situation and those interested in investing in Chinese incorporated mining companies can keep abreast of developments via the website, www.chinamining.org. My conclusion is that investors should confine any direct China exposure to overseas incorporated companies operating in China who clearly have established strong relationships with reliable local partners or supporters. Professional investors are better able to look after themselves and may like to buy Chinese incorporated stocks which are arguably nearer the action.

Table 1.1 Chinese incorporated mining companies

Company	Minerals	Where listed
China Coal Energy	Coal, electricity, aluminium	Hong Kong, Shanghai
China Shenhua	Coal	Shanghai
Yanzhou Coal	Coal	Hong Kong, NY
Zhoajin Mining	Gold	Hong Kong
Jiangxi Copper	Copper	Shanghai
Aluminum Corp of China	Bauxite, aluminium	Shanghai
China Molybdenum	Molybdenum	Hong Kong
Lingbao Gold	Gold, silver, copper	Hong Kong
Zijin Mining	Gold	Hong Kong
Yunnan Tin	Tin	Shenzhen
Shandong Gold	Gold	Shanghai

Note: The above table contains only those mining companies actually incorporated in China. The list is not comprehensive and new Chinese IPOs come to the market on a regular basis.

Russia

Like China, Russia, the great bear, is attracting increasing investment attention as far as its natural resources are concerned. It is also attracting attention for the way it appears to change the rules relating to project developments, particularly in the energy field. Although we have yet to see this happen on a big scale in metals and mining, it is clear that there are considerable risks attached to both investing and operating in Russia which investors need to factor into their investment strategy. It is particularly the case that local partners can fall in and out of favour with central and local government with sometimes serious repercussions for project ownership and therefore for shareholders.

Investors might also feel nervous about the safety record of the Russian owned mining industry – a problem in China also. Serious mine disasters are unfortunately all too common, although this seems to be less of a problem with internationally listed companies.

Less risk with small companies

Project scale is important though and smaller projects are far less likely to attract attention than the giant ones like Shell's Sakhalin gas development. Whilst operators like Peter Hambro Mining (PHM) believe that their projects are robust with well chosen local partners, I remain far less certain than some of the wisdom of direct Russian investment. Smaller operators like PHM have ambitions to grow and become major gold producers within Russia. At a few hundred thousand ozs of production the authorities are unlikely to be that interested, but if PHM goes over a million ozs and continues to grow it becomes a much more substantial company in the market's eye. Since the Russian government views gold as a strategic metal (it has stated that it wants to increase the gold portion of its reserves) it is not impossible that it might want to look at the ownership structure of any growing gold output.

It is important to remember that in the wild west days following the fall of the Soviet Union and the revival of the Russian stock exchange there were incidents where legitimately acquired shareholdings were simply removed from the company register by directors who didn't like the cut of the investor's jib. The UK incorporated Sibir Energy suffered a loss when it found that its 50% stake in an oilfield development in Siberia had been diluted down to virtually nothing.

There are a number of Russian mining companies listed overseas which are major producers, including Norilsk (PGMs and nickel) and Polyus (gold). Also, companies such as Severstal, the Russian steel group, are becoming more active, both in overseas corporate activity and in capital raising in foreign markets. However, like China, there are a considerable number of foreign incorporated companies active in Russia with listings on AIM and on the TSX Venture Exchange. Whilst nominally a multi-party state now, Russia retains a lot of the feel of an authoritarian state – which it has been for most of its history. Its actions in terms of shareholder rights are not always best practice by western standards and I doubt that Russian corporate governance would match up to western standards either. There can be no doubting the potential that Russia has in the natural resources arena, but I doubt that any investors in Russian stocks would really be able to rest easy at night.

Other countries

The question of country risk

The countries reviewed above make up the prime targets for investors seeking stock market exposure to the sector. They are familiar to many investors, which helps in terms of comfort, and the fact that all information flowing to the market about the quoted companies is in English is additionally helpful. However, there are other countries and markets, as mentioned earlier, where interesting situations can be found; the problem lies in whether the country risk is acceptable. Some might say that, despite the size of its mining industry, South Africa remains, in the post-apartheid era, a risky country with the pressure for addressing past injustices, particularly, creating unwelcome financial uncertainty.

The questions that an investor has to ask himself when considering buying shares in Russia's Norilsk or Brazil's Vale is about the quality of the information available, and how much of it is in a language he can understand, and also whether, as a foreign shareholder, he will be treated fairly. There is also the issue of political risk. Is the business environment stable? Is the tax regime fair and likely to remain so? Is it possible to freely remit dividends and share sale proceeds overseas? Foreign investors must also weigh up the chances of unilateral expropriation, perhaps less of a worry in an age of economic globalisation and interdependence, but real enough for those whose memories go back 40 years to when countries like Cuba and Chile did just that. And in the last year or so, as the metals bull market has led to huge profits growth in the mining industry, many countries have begun actively to look at their tax and royalty rates. Already, Bolivia and Venezuela have taken action to raise taxes and to forcibly take stakes in both energy and mining sectors. Other countries more favourably disposed to the private sector, like Chile and Zambia, have increased royalty rates, and I would expect this trend to continue, even when the current metals bull market has run its course.

Some reassurance, however, can be gained from the fact that most of the non mainstream (in market terms) companies that might interest investors have listings in other major markets like London and New York, which makes both dealing and settlement relatively straightforward. This, of course, would not protect foreign investors from any precipitate action which undermined their interests, but since their shares would be held by powerful international custodians that could well act as a disincentive against such action.

The issues of choice

There are obviously pitfalls in investing in any mining country, with the environmental angle being common to all. Australia has to be particularly sensitive about the interests of its indigenous people, even though they comprise only a small minority of the population. In Canada and the US the environmental issue is a major problem and labour costs are also high. Canada in particular is still prospective as a minerals province, and the establishment of substantial diamond mining operations in the last few years is an example of this. Canadian mining companies are also successfully active in other parts of the world, particularly Latin America.

South Africa remains the most problematic country. It has a great mining tradition and much of the expertise associated with that remains in place. Its central importance to the economy is unarguable, but this does give it a high profile, and because of that it is currently in the firing line of both government and political groups seeking to siphon off its cash flow. During the apartheid era most South African mining companies could be counted on to pay out good dividends as a counter to the perceived political risk. These days, dividend flows from South African companies, with the possible exception of the fairly full distributions of the platinum companies, are more modest as companies seek to emphasise the growth prospects of retaining earnings for expansion.

The UK plays host to many of the largest mining groups in the world and some of them have a reasonable spread of operations both in respect of countries and metals. Conservative investors and, in these days of litigation and the suspension of *caveat emptor*, their advisers also, find this reassuring but the underlying country risk is only hidden by their UK incorporation, not banished.

Farther afield there are opportunities, but perhaps we are living in a particularly benign time for investment in faraway places about which we know little. Worthless share and bond certificates from an earlier age can still be found in many a trunk in many an attic, relating to countries that sank into economic chaos or political despotism but which in recent years have risen again to become the emerging markets of today.

Whilst mining remains a large and important industry for a large number of countries, its position as far as total GDP goes is relatively modest. This is not really unexpected as many mining countries are advanced or relatively advanced economies, and their GDP is dominated by services and value added activities which have a final value far in excess of the value of their mineral output, as the figures below show.

Table 1.2 Mining country GDP and minerals value

	Currency	GDP (bn)	Minerals value(bn)	% of GDP
Australia	$A	906	34	3.7
Brazil	Real	1,829	66	3.6
Canada	$C	1,569	34	2.2
Chile	Peso	58,688	19,390	17.1
China	Yuan	19,217	3,74	1.9
Russia	Rouble	18,911	850	4.5
South Africa	Rand	1,413	94	6.6
United States	$	13,220	64	4.8

Source: IMF Statistics, HSBC, UN Statistics (Latin America), National Data Book (US), Natural Resources Canada, SA Reserve Bank, Economist Intelligence Unit.

Note: The GDP figures relate to 2006 figures drawn from various sources. The figures for minerals value are drawn from a variety of sources also but are not necessarily up-to-date and are subject to revision. However, they do enable readers to get some idea of the relative importance of national mining industries within the general economy.

The world of metals

Metals can be split into a number of groups but we are going to divide them into four categories plus gold. Those categories broadly cover:

- major industrial metals,
- minor/specialist metals,
- industrial minerals, precious metals minus gold, and
- gold itself.

Although categorising metals could be construed as subjective, mining share investors need to have some basic support for their investment decisions, and knowing which metals provide the most likely stock market returns is a good foundation for such decisions.

The special cases of steel and aluminium

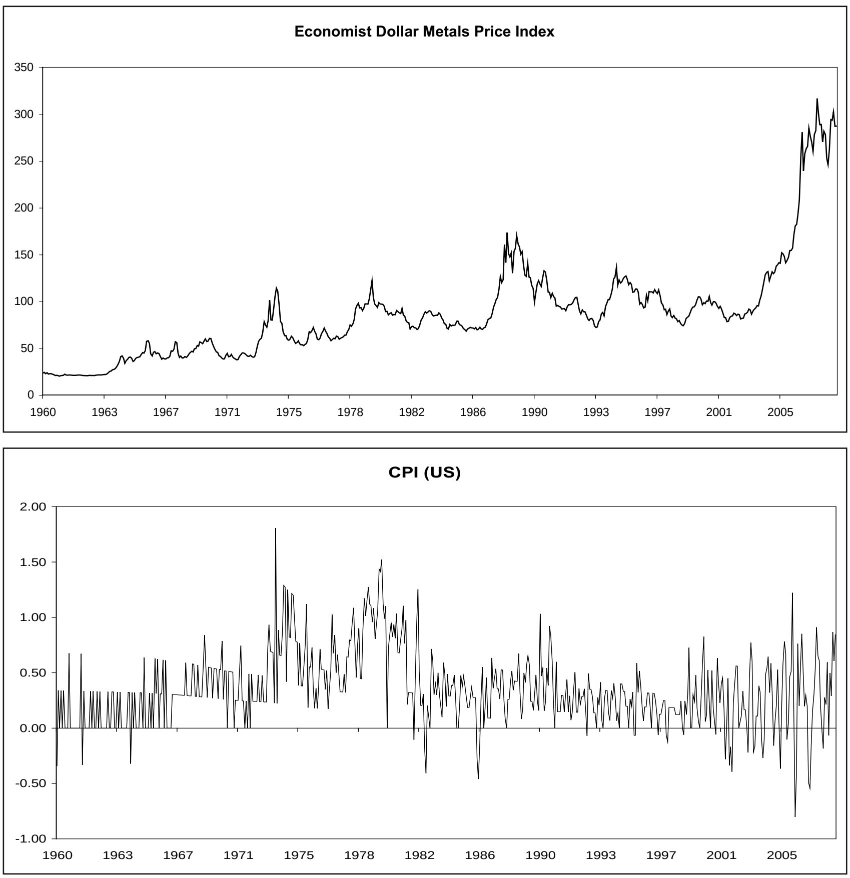
In the mining sector there are two anomalies which need to be defined. Most metals are mined and after processing used in their native state. For example, copper ore is mined and then processed into copper metal which has a number of applications in its own right. Two key metals are not mined in their native state – aluminium and steel; as explained below they are derived from bauxite and iron ore respectively. It is therefore arguable whether stockbrokers' mining analysts should cover the steel and aluminium industries, as they are processing industries sharing more in common with the *metal bashing* side of engineering than with mining.

Relationship between metals and the macro-economy

It is also worth considering, as a broad point, where the various groups of metals fit into the macro picture. Major industrial metals, including the well-known base metals, are primarily affected by prospects for economic growth, thus in an economic upturn demand for and the price of the metals will tend to rise. It is extremely unlikely that such metals will do well in price terms if economic conditions are unpromising. There is one possible exception to this rule, price movements at times of high inflation – as we saw in the 70s.

Then investors might well look at metals as hedges against inflation, although if inflation leads on to a squeeze by the authorities raising interest rates the ultimate fall in real consumer demand will eventually prick the speculative metal price bubble.

Chart 1.1 Economist Dollar Metals Price Index & CPI (US)



Source: Global Financial Data

Minor metals

Minor and specialist metals are unlikely to be targets for investors in commodities as the markets in such metals are usually very thin and illiquid. Minor metals are therefore influenced primarily by economic growth prospects, as are major metals. There is, however, the possibility that a minor metal may have particular application in a fast growing industry which has a momentum quite separate from the mainstream economy, specialist metals used in mobile phones in the late 90s would be an example of this.

Industrial minerals

Industrial minerals are primarily mined as soft crumbly ore and then processed into metals. Whilst economic growth rates have an effect on prospects, industrial minerals are often low value bulk commodities where basic demand is relatively inelastic as far as the economic cycle is concerned, and price changes are usually the result of natural shortages or surpluses.

Precious metals

The other area we will look at is the precious metals sector, including gold. Gold is a metal with characteristics which mean that it can perform very well during times of economic weakness if that weakness is accompanied by inflation and/or strains in the financial system. It also does have linkages with the economic cycle, as one of the key areas of consumer demand for gold is jewellery. Other precious metals, particularly platinum, are influenced by consumption driven economic growth, although platinum is seen as something of a technological metal which does give it some ability to outperform the economic cycle.

Diversification against specialisation

It can be taken as read that mining companies are primarily driven by the demand for and price of the metals they produce. At certain times and in certain conditions, for instance when strong economic growth is driving demand for raw materials, investment in companies with a wide spread of metals may be thought sensible. Some of those may be major industrial metals such as iron ore and copper. Others may be more exotic metals such as tantalum and magnesium for which there is accelerating demand from a low base level, providing the possibility of long-term growth. This spread is often seen as prudent, providing some protection against weakness in one metal when others are perhaps performing satisfactorily. In some circumstances market attention is caught by just one metal, and diversified mining groups are ignored as investors seek shares that maximise their exposure to the desired metal; in the late 90s and early 2000s platinum was one of those metals.

The nature of cyclicality

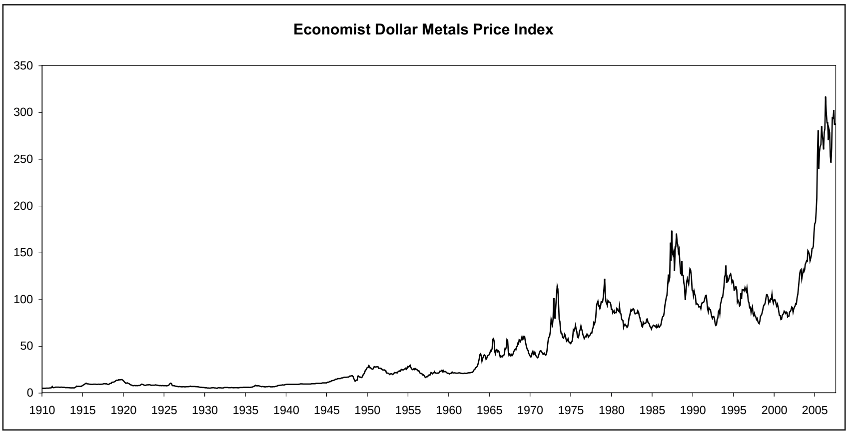
Some of the principles that should be applied to investing in mining shares are not exclusive to that sector but can be used across quite a sizeable part of the stock market. What we are particularly talking about here is cyclicality, because demand for metals is driven by the waxing and waning of the economic cycle and that is a key component of metal pricing. Cyclicality, though, could equally be applied to, say, retailing where the personal debt cycle would have a critical influence on people's spending plans and therefore on the turnover and profits of retailers.

The nature of the economic cycle means that even if growth is a long-term phenomenon there are periods, fortunately usually short-lived, when economies stall or even weaken. The effect on metals of these slowdowns can be severe these days for two reasons:

1. A large component of economic activity derives from the service sector which is a minor consumer of metals and also tends to perform better than manufacturing during an economic downturn.
2. There is a tendency these days in manufacturing to use less metal and of a lighter weight than formerly. Motor cars would be a good example of this, although because of the rise in electronic systems in cars much more copper (wiring) is used than, say, twenty years ago. Manufacturing growth

also tends to be faster in items such as electronic goods where the metals used are less important in terms of the selling price than the value added technology that goes into the goods.

Chart 1.2 Economist Dollar Metals Price Index



Source: Global Financial Data

What is the future for metals?

From the above it might be thought that metals have had their day and become merely a sideshow to the main event of service industry/high technology powered growth. Certainly during the internet boom between 1998 and 2001, investors found little to excite them in the mining sector. But midway through 2001 the gold price finally bottomed and gold shares began a rise that within a year saw some of them achieve price increases of five times and better. By 2003, the base metals and other industrial metals had begun to flex their muscles as well and prices began to rise driven by accelerating Chinese economic growth. At the same time low interest rates and low inflation were keeping the advanced economies on a growth path that also exerted upward pressure on metal prices. Russia, helped by spiralling energy prices, India and Brazil were all growing rapidly and adding pressure to the boom. Indeed, having been seen as a sunset sector in the 90s the pundits have begun to talk about metals and other commodities being in a long term ‘supercycle’. Whilst physical demand for metals was strong in its own right, there was further stimulus from investment buying of metals by big institutional investors which provided additional support for commodity prices.

Whether we are in a supercycle or not, infrastructure spending in both private and public sectors, which is heavily skewed towards raw materials, remains a priority for the poorer countries of the world and for some of the larger ones also. Infrastructure development and renewal, with its high consumption of metals and other minerals, will surely continue at a rapid rate for many decades in China, Russia and India. It could also be argued that even advanced economies like the UK are in need of heavy spending on capital investment over the longer term in a number of areas, including transport, health and education, owing to the country’s position as the oldest advanced industrial economy. And even the mighty US economy has its infrastructure problems, and the power blackout in the US in 2003 was a dramatic example of the consequences of failing to renew the physical power network.

The odd thing about all this is that none of it is new, the Chinese growth story based on rapid modernisation of the economy was around in the 90s. The problem was that few were prepared to do the proper analysis and work out the long-term winners in their correct order. The view was that the Chinese were going to need a huge number of mobile phones etc., the fact that before that they would need new cities with housing, roads, hospitals, etc. all requiring huge amounts of metals, energy and other raw materials was forgotten. Now opinion has turned on a sixpence to believe that so great will be Chinese demand for raw materials that a supercycle beckons, driving the demand for and the price of metals to new highs. Well, we shall see.

Certainly there are grounds for optimism that the present strong market in metals can continue for some years, although it is likely that there will be sharp downdraughts from time to time. An example of this was nickel in mid 2007 when it peaked at a scarcely believable $50,000 per tonne and then halved in a matter of months. The thing to bear in mind is that consumer demand is high but there is also the complicating factor of investment fund buying. Investors as opposed to consumers tend to gear up their positions and often don't hold physical metal but rather paper metal, frequently through derivatives. This means that their positions can be more speculation than investment and consequently volatility can lead to very sharp price movements as the funds panic on both the up side and the downside – as happened with nickel.

One critical factor is the ability and desire of the mining industry to respond to higher metal prices by increasing production. This is something that may be more measured than in the past and many mining companies this time round have taken their time to decide whether the surge in metal prices is sustainable and what their response should be. In the end it is inevitable that there will be expansion of metal supplies, partly as a result of new discoveries and partly as a result of expanding existing operations. The industry seems to have come round to the view that the huge appetite for metals from China, India, Russia and other emerging giants like Brazil is likely to continue over the longer term. That, however, does not mean that we can expect a huge and immediate expansion of output with a consequently depressing effect on metal prices. It takes many years for such output increases to come through and presently there is no danger of indigestion in terms of supply, indeed in the case of gold, mine production has been falling slowly for some years and shows no signs of recovery despite the more than doubling of the price over the past three years or so.

Privatisation of mineral production

So even though raw materials no longer have a central position in the advanced economies their importance is not to be underestimated. There is also another interesting factor to be borne in mind relating to the steady privatisation of mineral production around the world. When government ownership of mineral production was widespread in the decades immediately after the Second World War there was a tendency for the financial disciplines critical to the health of the private sector to be ignored. This meant that mineral production was often hopelessly uneconomic as the state underwrote any losses, and developed mines and stockpiled metals for strategic reasons irrespective of the economic cost. These days production levels are kept much closer to demand levels than formerly. This can lead to sudden shortages when economic activity picks up, with a coincident and positive effect on metal prices and on mining shares. This is a little different from the past when overproduction meant that shortages of metals, and thus an increase in their price and a rise in mining share prices, tended to happen much later in the economic cycle. But as we will discover later the issue of nationalisation of raw material extraction in, particularly, Latin America is dormant rather than dead, and both Bolivia and Venezuela have been flexing their muscles as metal prices and mining company profits have risen.

Major industrial metals

Industrial metals are those used in the broad manufacturing and construction process. The major metals are those that are most widely consumed using measures of both value and volume. Some of these metals are referred to as *base metals* including copper, lead, zinc and tin. I would also include nickel in the group, although nickel is sometimes described as a steel industry metal. Base metal is not a precise term but refers to the better known *chemically active metals*. Steel and aluminium are two of the prime major metals and are found in almost every area of manufacturing and construction, although they are not base metals as they are processed from primary raw materials, iron ore and bauxite.

Since the key to profitable mining share selection is picking not only the right moment in the cycle but, at least as equally important, picking the metal with the best growth prospects, an appropriately analytical approach is required for the task. Questions that need to be asked include:

- Which metal has the best fundamentals as far as supply and demand is concerned, i.e. where is an actual or probable deficit in supply to be found?
- Which metal has the best fundamentals regarding growth in consumption?

- Which metal has the best stock market exposure, i.e. where is there likely to be sufficient liquidity due to plenty of stock choice to allow big funds to join the action?

Copper

Copper is one of the most widely followed metals. It is mined in a large number of countries and has important uses, particularly in construction/housing and electronics where its key property as a highly efficient conductor of electric current is prized. There is an element of national custom in the uses of copper, although its use in electric cable is universal. Copper for domestic water piping, for example, is more common in the UK than in many other countries where plastic or steel/iron piping is often preferred, even though it is much easier to work and shape copper piping.

Pricing is always an issue for metal usage. The boom in base metals in the late 60s led to a substantial jump in the copper price. Around that time there was a widespread investment programme in electricity generating capacity and a consequent increase in the building of pylons and laying of electric cables. Although copper cable is arguably the most efficient conductor of electric current, the rapid rise in the metal's price led to a reduction in the use of copper in generating cable by cladding the cable with aluminium, and this kind of cable became the industry standard. Over the last three years or so the copper price has soared to unexpectedly high levels beyond $3.00 per lb, and thoughts have once more turned to the sustainability of such levels in the face of inevitable attempts to substitute other materials. One of the problems, however, is that substitute materials will have gone up in price also; in plumbing, plastic pipes can replace copper but plastic's raw material is oil and that has risen more than fourfold.

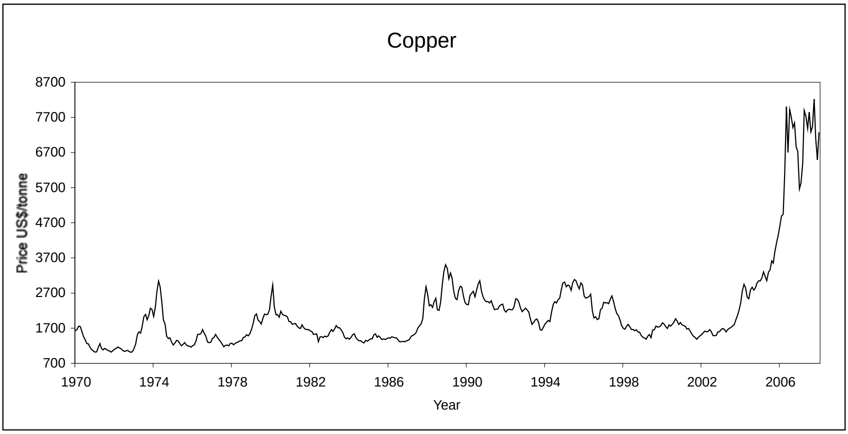
The main diversified mining companies, including BHP, Rio Tinto, Anglo American and Xstrata, all operate copper mines and count this as a core part of their businesses and, since its takeover of Phelps Dodge, Freeport-McMoran Copper has become one of the largest copper miners. In addition, there are a number of other companies including Antofagasta, Kazakhmys, Vedanta and First Quantum who are sizeable producers. After gold there is no other metal whose price movements have such an impact on the mining share market as copper.

Table 1.3 Copper statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	860,000	24,000,000
Canada	585,000	9,000,000
Chile	5,470,000	150,000,000
China	920,000	26,000,000
Indonesia	920,000	35,000,000
Kazakhstan	460,000	14,000,000
Peru	1,200,000	30,000,000
Poland	470,000	30,000,000
Russia	730,000	20,000,000
United States	1,190,000	35,000,000
Zambia	530,000	19,000,000
Others	1,800,000	65,000,000
Total	15,365,000	457,000,000

Source: US Geological Survey

Chart 1.3 Copper



Source: Datastream

Zinc

In an environmentally conscious age, zinc is a metal with positive characteristics. It is non toxic and its key uses are in galvanising steel, die castings, construction, the manufacture of brass, pharmaceuticals, cosmetics, and agriculture. The life cycle of many zinc products is long – zinc sheet used in roofing and cladding can last beyond 100 years and galvanised coatings for steel products can prolong the life of the product by up to 50 years. Zinc is also completely recyclable, losing none of its essential properties in the process.

Zinc usage has been rising over the last 30 years at around 3% per annum. Its position as a key metal in the construction and transport industries underlines the likelihood that growth in demand will continue to at least match OECD growth rates. It can probably exceed that in the nearer term in the wake of rising Chinese demand, although China is itself one of the world's largest producers and has been increasing output materially. At the beginning of 2004 the zinc price stood at $1,000 per tonne, a 100% increase on its early decade levels, but a level it had traded around for much of the 90s, although it had spiked to around $1,500 in 1997. Before that it had almost reached $2,000 in 1989. By the end of 2006 it stood at around $4,500 per tonne, although in 2007 it halved as speculative demand shrunk in the face of fears of increased supply. All of these prices have not been adjusted for inflation. In real money terms the distant ones will be much higher, and indeed the earlier peak price for 1974 of around $1,800, in today's money probably matches the recent peak. In the shorter term, through 2008 new zinc capacity is expected to come on stream, an inevitable consequence of rising demand and a fourfold increase in the metal's price.

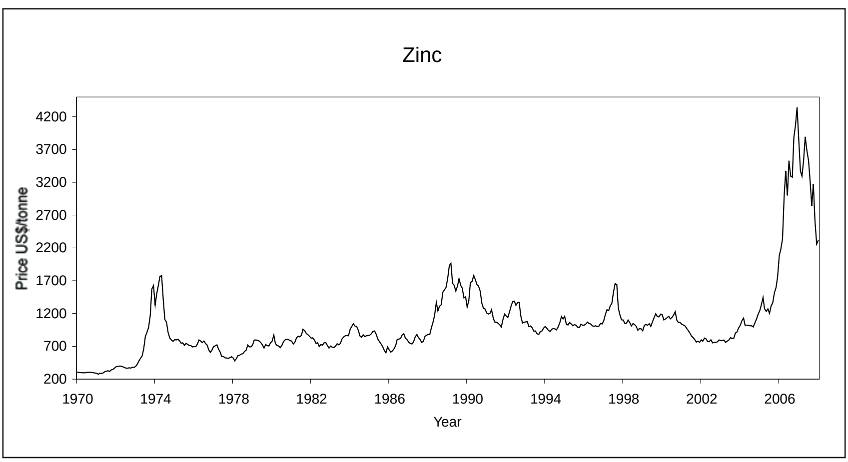
One of zinc's problems, particularly when metal markets are quiet, relates to its geological environment since it is often found in ore that is also rich in lead and silver, two metals we look at below. If the price of one of the three metals goes up, that can create problems for the other two metals if their prospects are less rosy. This is because the rising price of the other metal could well encourage an increase in mine output. The mine can then find itself with a surplus of the other two metals, for often it has limited scope to 'favour' one metal over another in its mining plan. This surplus then sends the prices of the other two metals sliding, which in due course threatens the economics of the mine and because of this, the production of the strongest metal. In the mid 2000s metals bull market that is less of a concern, but bull markets do not last forever. Amongst the leading quoted zinc producers are Teck Cominco and Zinifex, who are also lead and silver producers as well, with Breakwater, Lundin Mining, Canadian Zinc and ZincOx among the smaller producers and explorers.

Table 1.4 Zinc statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	1,400,000	42,000,000
Canada	680,000	5,000,000
China	2,800,000	33,000,000
Kazakhstan	400,000	14,000,000
Mexico	480,000	7,000,000
Peru	1,500,000	18,000,000
United States	740,000	14,000,000
Others	2,500,000	49,000,000
Total	10,500,000	182,000,000

Source: US Geological Survey

Chart 1.4 Zinc



Source: Datastream

Lead

Although in an environmentally aware age lead, with its image as a highly toxic metal, should no longer excite much interest, it still has many important applications in construction and transport, with its prime use in the manufacture of batteries. Lead, however, is a good example of a metal which has the ability to reinvent itself. Historically it was widely used in domestic piping and petroleum products, its malleability being a key attribute as far as the former use was concerned. When its toxicity became more appreciated it was quickly phased out of piping and finally petrol, but the growth in battery usage more than compensated.

The metal itself is seldom found on its own but usually in a polymetallic (more than one metal) environment along with zinc and silver. This has historically created problems for investors assessing new mineral discoveries, for if the deposit was heavily weighted towards lead, in terms of percentage of metals present, the deposit was usually uneconomic unless the lead grade in the ore was very high. This was because the increase in lead consumption was slow; this consequently undermined the metal's price unless there was a matching fall in production leading to shortages even of lead. As mentioned above, the leading zinc producers are usually major lead producers as well.

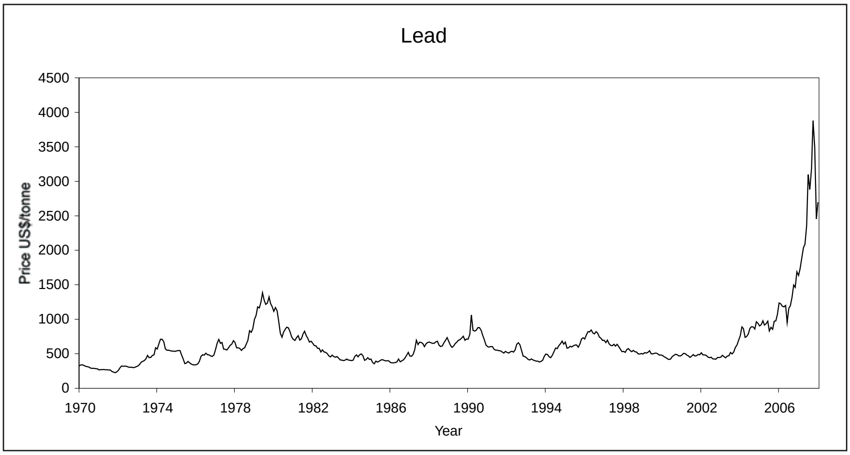
In the current metals bull market, lead has surprised everyone by surging to heights not even reached in the 70s when the metal had something of a revival, partly as a result of defence spending where one of its roles was as a cladding to protect against battlefield nuclear warfare. More recently it has benefited from exceptional Chinese growth; the country is the world's largest consumer of the metal and is a major exporter, although export volumes have fallen as internal demand has risen. Also, helpfully the demand for batteries increased at a time when mine production stalled.

Table 1.5 Lead statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	640,000	24,000,000
Canada	75,000	400,000
China	1,320,000	11,000,000
India	75,000	n/a
Ireland	55,000	n/a
Kazakhstan	50,000	5,000,000
Mexico	110,000	1,500,000
Morocco	45,000	500,000
Peru	330,000	3,500,000
Poland	50,000	n/a
South Africa	45,000	400,000
Sweden	75,000	500,000
United States	430,000	7,700,000
Others	250,000	24,000,000
Total	3,550,000	78,500,000

Source: US Geological Survey

Chart 1.5 Lead



Source: Datastream

Tin

The main producers are in the Far East, with China the biggest force in the market both as a producer and as a consumer. The main uses for tin are the traditional ones of solder in the electronics industry and tinplating. Growth in consumption remains quite brisk over the longer term, helped by its importance in electronics. There are few quoted tin mining companies these days. Historically, the sector, which in London used to be dominated by Malaysian based companies, was seen as cyclical with the main rewards for shareholders coming from dividends rather than capital growth. A number of income funds used these stocks and their sister plantation companies to bolster income receipts.

Whilst there is no particular reason why tin mining should not provide investment opportunities the recent record is unexciting to say the least. One example of this is the old Renison Bell mine in Tasmania which was acquired by Australian junior and AIM listed Murchison United in 1998. Seen as a cash cow for Murchison at the time, the Renison mine was sold to Bluestone Tin (now Metals X) in 2004 after a weak metal price and an ill-advised sortie into Portugal almost sunk Murchison. The new owners, after spending A$40 million on refurbishing Renison, had to put it on care and maintenance due to the continuing weak tin price. More recently a sharp rise in tin has put the fate of the mine back on the front burner.

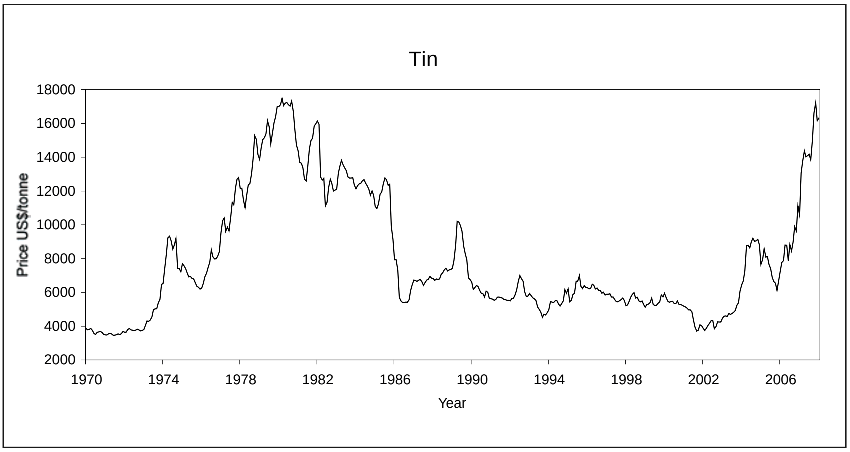
There have also been attempts in the past, all ultimately unsuccessful, to revive the UK's ancient tin mining industry in Cornwall as a result of intermittent surges in the tin price and the perceived appetite for UK incorporated mining companies outside the restraints of the UK's then exchange controls. These controls, which were abolished in 1979, meant that UK investors had to purchase investment dollars at an often substantial premium to the spot exchange rate (the dollar premium) to invest in foreign mining companies. Investment currency was not needed to buy UK incorporated companies. There have also been attempts to have the actual Cornish tin mining sites declared World Heritage sites.

Table 1.6 Tin statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	2,200	150,000
Bolivia	18,000	450,000
Brazil	11,800	540,000
China	130,000	1,700,000
Congo (DRC)	3,000	n/a
Indonesia	85,000	800,000
Malaysia	3,000	1,000,000
Peru	38,200	710,000
Portugal	200	70,000
Russia	4,000	300,000
Thailand	200	170,000
Vietnam	3,500	n/a
Others	4,000	180,000
Total	303,100	6,070,000

Source: US Geological Survey

Chart 1.6: Tin



Source: Datastream

Nickel

Nickel is a high value, relatively low tonnage produced metal (certainly compared with other major base metals like copper). It is used mainly as an additive to steel and its main consumption areas are stainless steel (around 65%), and in the manufacture of nickel and steel alloys. Growth is expected to be well ahead of general economic growth rates, partly as a result of the huge increase in China's steel production capacity, and even if Chinese growth was to relent, nickel consumption should achieve annual increases of 5%. Supply, which is dominated in stock market terms by Norilsk of Russia, Brazil's Vale (CVRD) following its acquisition of Inco of Canada, and UK listed BHP Billiton following its takeover of WMC of Australia (now primarily a processor of the metal rather than a miner), is lagging behind long-term growth, although Norilsk does from time to time have high metal inventory levels which can overhang the market. The longer term market is also having to grapple with the fact that new Australian nickel production, using historically difficult-to-treat laterite ore and new treatment processes, is struggling to achieve half reasonable levels of production.

This slow growth in supply coupled with sudden surges in demand brought on by the steel cycle has historically led to huge swings in the nickel price, with prices in the mid 2000s reaching undreamt of levels. The accompanying chart shows nickel's sharp cyclical price swings with a historical high in 1988 during a period of patchy strength in the broad metals market. This peak has been completely overshadowed, however, by activity in 2006 and 2007, when the price reached $54,000 per tonne or $24.50 per lb when many producers had costs of a fifth of that figure. In situations like this it is wise to keep an eye out for consumer attempts to substitute or use less nickel, as we have seen with copper substitution in the 60s, and more recently the price has halved from its peak reflecting those concerns.

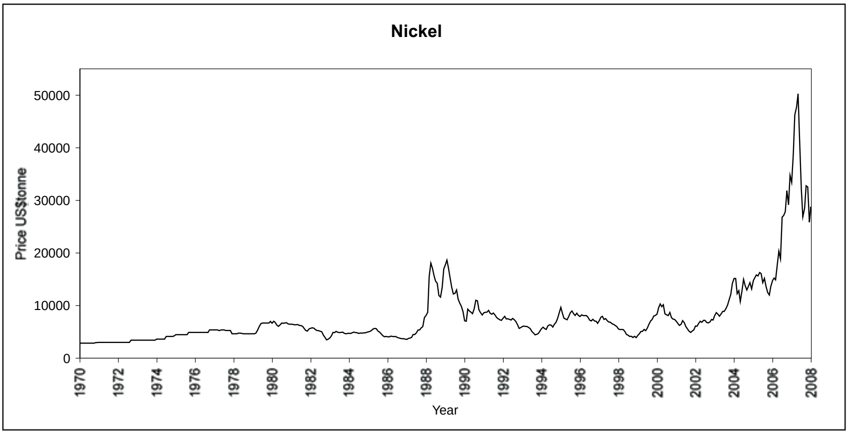
The metal, which was central to the Australian mining boom of the late 60s, continues to excite corporate and investor interest. As well as the Australian laterites there are also similar deposits under investigation in south-east Europe and the Pacific basin, and Canada. The latter, one of the major producing countries, remains highly prospective for new finds such as Voisey's Bay, discovered in the early 90s and finally in production in 2006. Nickel is now established as a metal whose producers can attract strong investor support when the production/price cycle is rising. The metal seems less interesting to investors where it is mined as a by-product, for instance by South African platinum miners who are quite big producers of nickel and where nickel revenues can represent 10% or more of mine production by value.

Table 1.7 Nickel statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	180,000	24,000,000
Botswana	35,000	490,000
Brazil	73,500	4,500,000
Canada	258,000	4,900,000
China	80,000	1,100,00
Colombia	99,000	830,000
Cuba	77,000	5,600,000
Dominican Republic	47,000	720,000
Greece	20,100	490,000
Indonesia	145,000	3,200,000
New Caledonia	119,000	7,100,000
Philippines	88,400	940,000
Russia	322,000	6,600,000
South Africa	42,000	3,700,000
Venezuela	20,000	560,000
Others	50,000	2,115,000
Total	1,656,500	65,,745,000

Source: US Geological Survey

Chart 1.7 Nickel



Source: Datastream

Bauxite/Aluminium

There is no doubt that aluminium is one of the most important metals used in the modern economy, its main consumers being the transport, construction and packaging industries. However, it is not mined itself but is a product of the mineral bauxite, one of the most common elements in the Earth's surface. Aluminium's key properties of strength and light weight make it an ideal metal in areas like vehicle building where fuel economy is important. This gives it a green angle as does the fact that it is easily recyclable and has a much higher scrap value than steel for instance; in the UK local councils will often collect aluminium cans separately for recycling purposes.

The price of aluminium is driven by market forces and the process of producing metal is very energy hungry. This means that soaring power prices from time to time can disrupt production as aluminium plants shut down in response to the crippling increase in operating costs. The record high for aluminium reached in 1989 of around $3,500 per tonne compares with around $2,800 reached in early 2007. This was a rather pedestrian performance measured against metals such as nickel. However, as with some other metals, a major increase in Chinese production in 2006 restrained the price performance as did a near doubling of LME inventories. An abundance of both bauxite and cheap power in China are likely to act as a continuing restraint on the price.

The main quoted aluminium stocks, such as Alcoa, are to be found in North America and the big diversified companies like Rio Tinto and BHP Billiton also have a big exposure to the metal, as does Australia's Alumina Ltd. Most producers of aluminium are fully integrated, mining aluminium's raw material bauxite, processing it into alumina for smelting into aluminium and then making basic aluminium products such as sheet and extruded bars. Some producers even take the process the whole hog and manufacture packaging items such as cans and aluminium foil.

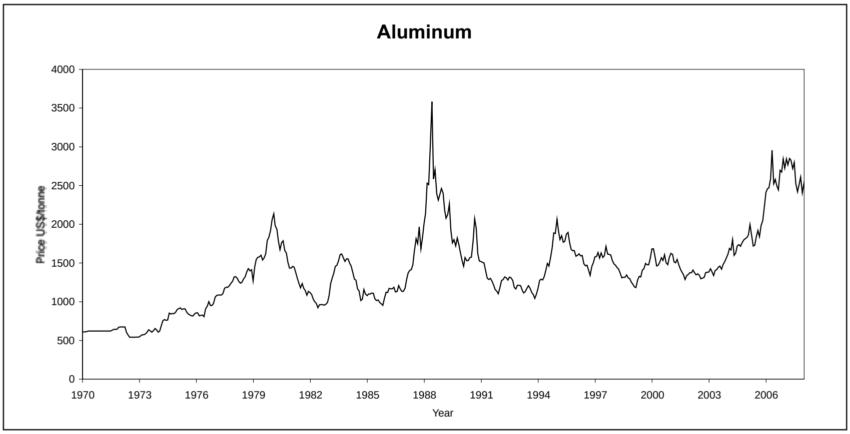
The development of Australia's bauxite/aluminium in the 60s excited wide interest amongst investors who saw it as part of the huge leap forward that that country's mining industry experienced in that decade. However, the integrated industrial nature of aluminium makes it more like the steel industry than the mining industry, and it could be argued that in today's markets aluminium shares are mainly of interest to investors who trade the economic cycle rather than investors whose specific interest is mining.

Table 1.8 Aluminium statistics (2006)

	Smelter production (tonnes metal)	Smelter capacity (tonnes metal)
Australia	1,900,000	1,950,000
Bahrain	870,000	830,000
Brazil	1,700,000	1,650,000
Canada	3,100,000	3,060,000
China	12,000,000	10,500,000
Germany	520,000	670,000
India	1,400,000	1,200,000
Mozambique	560,000	570,000
Norway	1,100,000	1,350,000
Russia	4,200,000	3,800,000
South Africa	900,000	900,000
Tajikistan	500,000	515,000
UAE	900,000	860,000
United States	2,600,000	3,700,000
Venezuela	630.000	675,000
Others	4,500,000	5,240,000
Total	37,800,000	37,470,000

Source: US Geological Survey

Chart 1.8 Aluminum



Source: Datastream

Iron Ore/Steel

Although the steel industry no longer is viewed as occupying the commanding heights of any economy, it remains a major industrial sector and is the prime customer of a wide range of metals, some of which, like cobalt and nickel are dealt with elsewhere. Like aluminium, steel is not mined but is the product of iron ore. The price of steel is not driven by market pricing in the sense that the prices of base and precious metals are, but is set on a contract basis between producer and consumer. The price of iron ore, the raw material, is also set on a contract basis.

The major producers of iron ore are China, Brazil, Australia and Russia in that order and the major consumers China, Japan and the US. Well over 90% of iron ore mined each year goes to the steel industry. Although iron ore is thought of as a relatively low priced commodity and also a rather stable one as well, its price changed little between 1980 and 2002 when it averaged around $23 per tonne in the US. However over the last few years the price has taken off with a 2007 price high of $84 with further price gains forecast. This has led to the consideration of lower grade iron ore deposits than formerly, when an economic deposit would have had to have been at least

60% pure in ferrous content. This was particularly the case with the Australian producers in Western Australia. In the current situation some deposits grading around 40% are being considered as possibly economic.

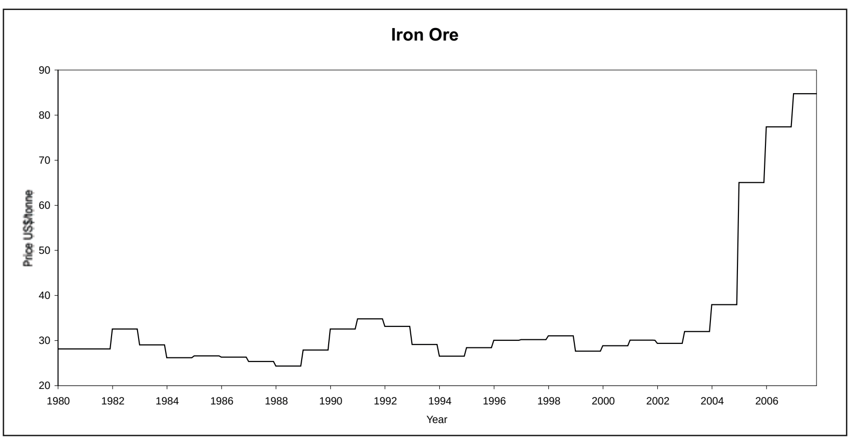
The opportunities for investing in iron ore shares have historically been limited for much the same reason as for coal (which we look at later). However, recently smaller players such as Fortescue Mining in Australia and Baffin Island in Canada, amongst others, have attracted attention as consumers such as China and Japan have sought newly located/owned future supplies as an alternative to traditional suppliers. The major producers are controlled by bigger groups, with the UK mining houses to the fore, and whilst a strong iron ore performance will obviously help Rio Tinto, since it is only around 10% of turnover the influence on earnings will not be overwhelming. The Brazilian giant Vale (CVRD) is another major listed producer. Whilst recent iron ore price action has been buoyant, historically the lack of volatility in the price of iron ore has restrained the share price performance of major producers in relative terms during past mining bull markets. Having said that, more recently there has been rising activity in the junior iron ore sector, and many consider iron ore market domination is behind the proposed BHP/Rio Tinto merger.

Table 1.9 Iron ore statistics (2007)

	Ore production (tonnes ms)	Ore reserves (tonnes ms)	Iron content (tonnes ms)
Australia	320	16,000	10,000
Brazil	360	16,000	8,900
China	600	21,000	7,000
India	160	6,600	4,200
Russia	110	25,000	14,000
Ukraine	76	32,700	9,000
United States	52	6,900	2,100
Others	253	32,700	17,650
Total	1,931	156,900	72,850

Source: US Geological Survey

Chart 1.9 Iron Ore



Source: Datastream

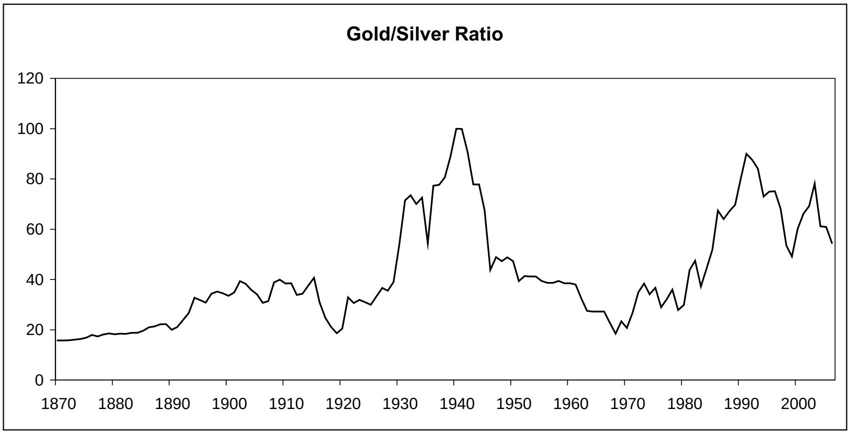
Precious metals/minerals

In this section I have excluded gold as its importance justifies a section all to itself. Also included here are platinum group metals such as rhodium that might more appropriately be covered under minor metals. I believe that investors tend to look at platinum group metals (PGMs) as a homogenous metals group when assessing the sector's prospects. I also include diamonds in this section. Precious metals have two distinct characters – they can be used as a store of value (particularly in gold's case) but they can also have wide industrial applications. The use of precious metals in jewellery spans both roles.

The image of precious metals can depend on when investors first started to take an interest in the stock market. Those who first surfaced in the late 70s will remember the huge rise in the silver price when the Hunt brothers, who made their fortune in oil in the US, tried to make another one by cornering the silver market with ultimately disastrous consequences for themselves and others. Before that, gold and diamonds, and their shares, had been very popular as stores of value during the highly inflationary years of the mid 70s. In recent years we have had strong but temporary runs in rhodium and palladium, two of the other PGMs, and in platinum itself, centring on long-term shortages in what are seen as metals for a high-tech future, shortages that have often proved short-lived.

The classic theory about *precious metals* is that the phrase describes the relative rarity of the metals, their beauty and therefore their often high price. This historic view is partly undermined by silver's fate over the last century or so, for its price now is a fraction of that of gold (currently a ratio of around 50 to 1 down from 15 to 1 in the 1870s), and it is rarely found on its own but rather in the company of lead and zinc.

Chart 1.10 Gold/silver ratio



Source: Datastream

Also, the historic role of both gold and silver as money, and thus a store of value, has led to substantial stockpiles of both in the hands of central banks in the case of gold and in private hands in the case of silver. Platinum, never having been classed as money, does not have large stockpiles potentially overhanging the market. Indeed, for that reason it could be argued that platinum is a much more logical precious metal to corner, i.e. to buy up all stocks potentially overhanging the market in order to force the price up.

Industry reaction to ETFs

The precious metals sector has also been the first to offer exchange traded funds (ETF) as a way for investors to gain exposure to metals prices without having to either store or take delivery of the metal purchased. The mechanics of ETFs will be dealt with later, but for the moment the issue is the rather different responses to precious metal ETFs that trade bodies and other interested parties have made to the setting up of ETFs.

Gold bodies like the World Gold Council have been very enthusiastic and promoted gold ETFs. The reaction to the silver ETF has been more mixed, with some bodies unsure as to whether a fund could purchase a meaningful amount of silver. Platinum producers and users have been negative on the setting up of an ETF because stock levels are very low and the possible surge in the price as the ETF starts up could damage long-term consumption growth.

It is important to note as a consequence that platinum producers have a control over their market denied to gold and silver producers. This underlines the fact that not all metal producers welcome surging prices, a gently rising price trend is often preferable.

Silver

We lead off with silver because of its historic role as a monetary metal, although its current value is hugely below the value of platinum and is likely to stay that way. The metal has a number of industrial uses in photography, electronics, homeware, and jewellery. It is arguable whether it any longer has a role as a store of value, although it is believed that Indians, whose main precious metal interest is gold, still have material amounts of silver hoarded. The popularity of digital photography and the downloading of pictures for distribution via the internet is thought by some to herald a serious reduction in demand for silver. Only time will tell and it is not in the scope of this book to argue on such technical matters.

Because of silver's position these days as a by-product metal, there are few companies that market themselves as primarily silver miners, which means that the prices of zinc, lead and gold are usually at least as important as silver in terms of profitability. There is also the problem of silver metal inventories which are notoriously difficult to calculate because no one truly knows how much is held in private Indian hands. Suffice it to say that newly mined silver production, like a number of other metals, runs well below annual demand, and disposals from stockpiled/hoarded metal is critical in bridging the gap. In recent years the silver price has revived a little but still stands well below the levels it reached in 1984. This disappointing performance has not undermined the enthusiasm of silver bulls who believe that recent strength in silver is just the start of a bull run that will eclipse 1980.

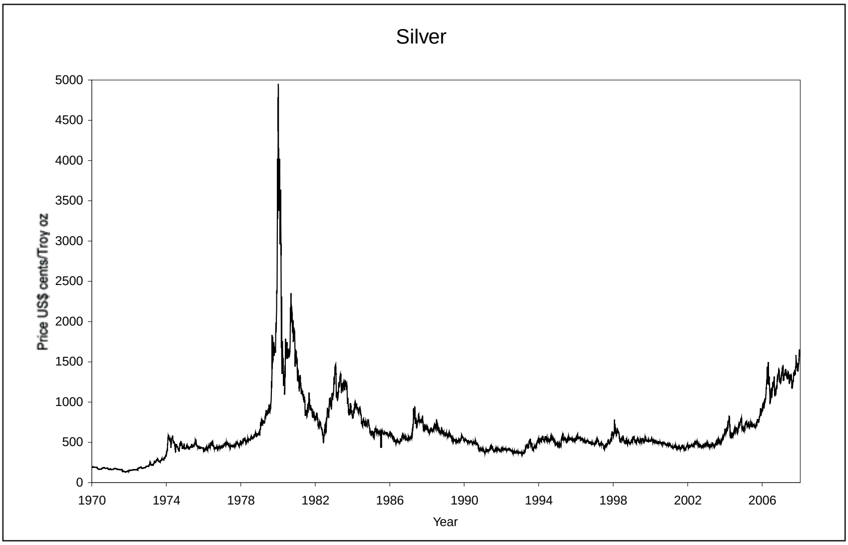
There are a few straight(ish) silver plays but they are almost all North American companies. Hecla and Coeur d'Alene, which also produce gold, are perhaps the two leading stocks. There are a number of smaller players including Silver Standard, Minco, Apex Silver and Excellon, all Canadian listed companies. They are highly cyclical and speculative shares primarily for the professional risk-taking investor. Over the years there have been a number of strong runs in the silver price but stock market profits have been scarce and transitory because of the paucity of silver shares, and the price has ultimately always disappointed, usually giving back all of its advance. Having said that, hope for silver springs eternal with such shrewd businessmen as Warren Buffett and Bill Gates having dabbled heavily in the metal and in silver shares in the past.

Table 1.10 Silver statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	2,000	31,000
Canada	1,200	16,000
Chile	1,400	n/a
China	2,700	26,000
Mexico	3,000	37,000
Peru	3,400	36,000
Poland	1,300	51,000
United States	1,220	25,000
Others	4,290	50,000
Total	20,510	272,000

Source: US Geological Survey

Chart 1.11 Silver



Source: Datastream

Platinum

The main uses of platinum are in car exhaust catalysts, jewellery, glass/fibreglass and petroleum refining. It also has a variety of potential high-tech applications including nuclear medicine and fuel cells. It can be argued that platinum's future is at least as bright as its past, in some contrast to silver, the main future excitement coming from the development of fuel cells which in due course are expected by some to replace petrol as the main method of propelling vehicles. It is important to understand, however, that the concept of fuel cells has been around for many years and progress in developing a commercial product has been very slow. More recently there was a flurry of market excitement surrounding fuel cell development companies but things have since gone quiet. There is also a growing lobby for electric and ethanol powered vehicles which are already quite widely available.

One of the main problems with platinum is that South Africa produces around 80% of the world's annual output and some investors may find that African investment, even in the relatively prosperous and stable South, is more risk than they care to take on. The other major producer is Russia which may not appeal much more than South Africa. There has been considerable effort expended on exploring for the metal in Canada, Australia and in northern Europe, and there is a producing mine in the US although it has a poor record of profitability. Ironically, outside South Africa the biggest platinum deposits are to be found in politically unstable Zimbabwe.

In South Africa itself there are four main producers, with Anglo American's Amplats the largest. The other three are Impala, Northam and former UK conglomerate Lonmin. Impala has recently acquired UK listed explorer African Platinum, and Lonmin has been even more aggressive acquiring Southern Platinum and Afriore, both Canadian incorporated platinum explorers with large resource bases. There are also a few smaller independent producers like Aquarius who have developed or are in the process of developing new mines in the wake of the Government's *use it or lose it* minerals policy. These new projects are often relatively small and of little interest to the major South African players who have bigger, long term expansion projects on their minds. There is also an international dimension to this South African dominated business, as the marketing of platinum, because it is a strategic metal, exercises the interest of the European Commission which has more than once stepped in to block mergers and asset sales within the industry.

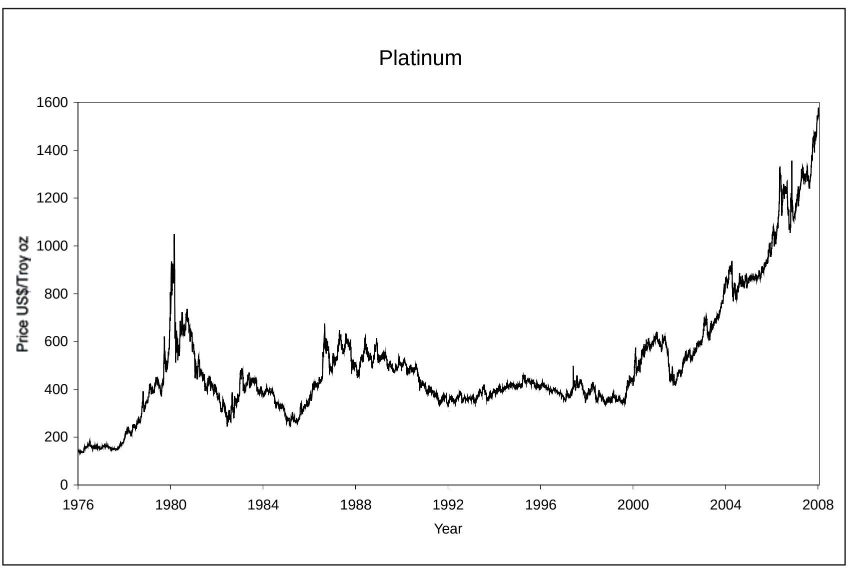
This domination of both production and marketing is reminiscent of the old set up of the diamond industry when De Beers's CSO controlled the market, of which more later. The discovery of a new platinum province, along the lines of the Canadian diamond discoveries of the 90s, would truly be exciting, providing considerable speculative opportunities in the market, especially in the light of the strong platinum price trend, which continues today, over the last few years.

Table 1.11 Platinum/PGM statistics (2007)

	Platinum Mine production (kilograms metal)	PGM Mine reserves (kilograms metal)
Canada	8,500	310,000
Colombia	1,100	n/a
Russia	27,000	6,200,000
South Africa	183,000	63,000,000
United States	3,400	900,000
Zimbabwe	5,400	n/a
Others	1,500	800,000
Total	229,900	71,210,000

Source: US Geological Survey

Chart 1.12 Platinum



Source: Datastream

Other PGMs

In essence when I talk about other PGMs produced in South Africa (which is the dominant producer) I am referring to palladium and rhodium, although osmium, iridium and ruthenium are also from the PGM group. Palladium and rhodium are primarily used in the manufacture of catalysts for the car industry and price is critical when manufacturers decide how much palladium and rhodium, in addition to platinum, to 'load' into the catalyst. Interestingly, around twice as much palladium is used in catalyst manufacture as platinum, and the loadings between the two are very price sensitive.

The South African PGM mines tend to produce considerably more platinum than palladium, whilst for the Russians the position is reversed. At the start of 2001 palladium reached a price level of $1,100/oz when platinum was around $900. Since then the price of platinum has improved and currently trades around $1,600/oz; palladium on the other hand has fallen back and now sells at around $370/oz. This volatility in palladium is an historic phenomenon and in 2003 it traded below $200; over the next few years a more stable price environment is expected as new supply comes on stream.

Rhodium, which is used to harden platinum and palladium, also has a volatile price history. In 1991 the price soared to over $7,000/oz as a shortage of supply allowed speculators to squeeze the market. By 2004 the price had collapsed to around $450, down from a 2001 high of $2,300. Currently it has recovered to over $7,000. Rhodium's ability to take metal market speculators on a roller coaster ride is proven. For mining share investors such volatility can really only be taken advantage of through platinum shares, as rhodium is not found on its own. Currently the value of Amplats' rhodium output is around a third of its total PGMs output, although it represents only 6% of the group's production by volume.

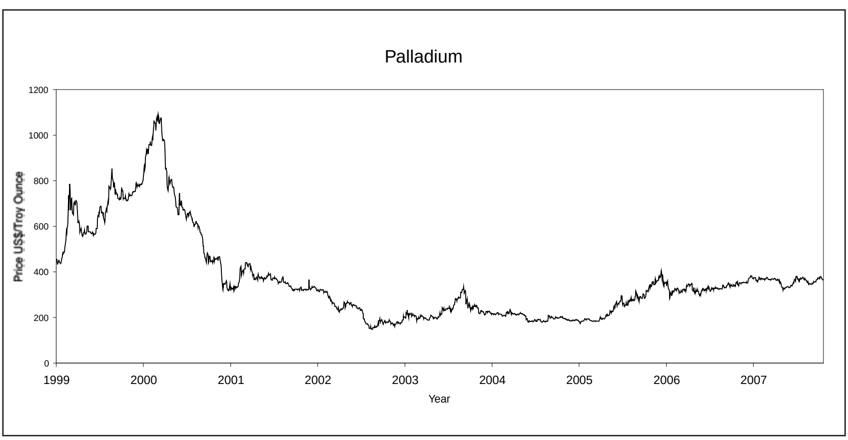
The volatility of both palladium (where Stillwater in the US is the only quoted primary producer) and rhodium, and their by-product position in South African PGM producers, the market leaders amongst quoted PGM plays, makes it very difficult to invest on a sensible basis. Any investment decision would have to pay close attention to quite sophisticated calculations about supply, price targets and substitution, and there is plenty of room for error.

Table 1.12 Palladium/PGM statistics (2007)

	Palladium Mine production (kilograms metal)	PGM Mine reserves (kilograms metal)
Canada	18,000	310,000
Russia	95,000	6,200,000
South Africa	93,000	63,000,000
United States	13,500	900,000
Zimbabwe	4,000	n/a
Others	8,100	800,000
Total	231,600	71,210,000

Source: US Geological Survey

Chart 1.13 Palladium



Source: Datastream

Diamonds

There are two prime categories of diamonds – industrial and gem. The former are low in value and as their name implies are used in industrial processes, and although they are naturally mined they can also be produced synthetically in a factory. Gem diamonds, primarily used in the manufacture of jewellery, are considerably more valuable than industrial and also rarer (only 15% of stones can be considered of gem quality). In terms of carats mined (1 metric carat weighs 200 mgs), industrial stones are around half the total, near gem a further 35%, with the balance being gem. Translated into value though, gem diamonds represent as much as 80% of the value of annual mined output.

Diamonds are mined in a variety of countries, the main ones being South Africa, Botswana, Russia, Angola, Namibia, the Congo, Australia and Canada. They are also to be found in Brazil, Sierra Leone and the Central African Republic, and exploration continues in a number of other countries including Finland and India, which was the main source of diamonds before the emergence of Africa in the nineteenth century.

Table 1.13 Diamond mine production by value (2006)

	US$ (bn)	% global output	Average value (US$/carat)
Angola	1.685	11	165
Australia	0.37	4	18
Botswana	3.574	27	104
Canada	1.499	12	122
Congo (DRC)	1.1	7	28
Guinea	0.17	1	227
Namibia	1.115	5	310
Russia	2.53	18	58
South Africa	1.722	11	90
Others	0.88	2	80
Total	14.475	100	

Source: BMO Capital Markets (guidance), Rapaport

Note: Rough diamond prices rose by around 10% in 2007.

The dominant position of De Beers

The dominant force in the diamond industry remains De Beers, now a private company effectively controlled by Anglo American. In recent years De Beers, which operated the diamond marketing cartel the Central Selling Organisation, has restructured its operations to move up the diamond chain into manufacturing and retailing. It remains the largest diamond miner and also continues to market diamonds through its renamed marketing arm, the Diamond Trading Company. However, the group no longer seeks to operate along monopolist lines as the buyer of last resort, a role it has claimed since the depression of the 1930s when it reorganised the industry to save it from collapse. It has also undergone a major geographical restructuring which has downgraded the importance of its London operation and upgraded both Botswana and South Africa in the sorting and selling areas.

Few investment plays

Looking at diamonds from the point of view of stock market investment, the table is rather bare. De Beers, which was a public company and one of the largest quoted mining groups, has been taken private and though Anglo American has a 45% stake in the company, the impact on its diversified profits at around 4% of earnings is negligible compared with its impact in the past. BHP Billiton controls the Ekati diamond mine in Canada, but results are hidden in a speciality products segment where that segment represents just 2% of group pre-tax profit. Rio Tinto owns the Argyle diamond mine in Australia and the Diavik mine in Canada but again its diamond activities are in earnings terms small, around 2.5% in 2006.

There remain a number of diamond exploration companies mainly listed in Australia and Canada, some of which like Aber Diamond and Southern Era do have current production. In South Africa, Trans Hex is the only remaining listed diamond miner of any substance. The disappearance of De Beers from the stock market has, therefore, left a very large hole in the sector. But the sector has also lost Ekati discoverer Dia Met to BHP Billiton, and Argyle discoverer Ashton Mining to Rio Tinto in recent years. Unfortunately the discovery of kimberlite pipes, the source of and setting for diamond mines, is a painstaking business and any major new diamond mines even if discovered soon will take many years to bring to production. Still, diamonds retain a fascination for mining investors, and if the current junior exploration effort does locate major new discoveries in due course, one would expect an upsurge of interest as happened when the Canadian discoveries were made a decade ago. For the moment Petra Diamonds and Gem Diamonds are two of the more significant diamond explorers and they also have some production as does the smaller Firestone Diamonds, and there are a number of other UK (usually AIM) listed explorers.

Minor industrial metals

As can be seen from the above not all metals historically attract the attention of mining investors. Perhaps, as with aluminium, the mining of the raw material is judged to be far less important than the upstream processing operation. Or perhaps like lead they are judged to be metals with very modest growth prospects and consequently of little interest. Having said that, the influence of China and India with their double digit growth rates (not to mention the other two BRIC countries, Brazil and Russia) is putting pressure on the prices of a number of lesser known metals.

Almost by definition minor metals have lower turnover value than their more weighty peers in the major sector, although the unit value of the metal may be high. That can mean that the sudden popularity of a minor metal can bring so much attention from prospective producers that potential output threatens to drown the market. As an example the price of tantalum in 2001-2, fired by forecast demand from the mobile phone industry, soared only to crash back.

Minor metals, however, are often seen as metals for the future with bright prospects based on high-tech growth industries. Nickel and platinum would not have been seen as major metals at the end of the Second World War, though nickel's strategic qualities no doubt were appreciated by the defence industry as it looked forward, and platinum jewellery had been very fashionable in the 1930s. Today, growth prospects for nickel and platinum are counted amongst the most promising of any of the major metals. So looking forward what does the future hold for some of the more prospective minor metals?

Tantalum

Having raised the subject of tantalum earlier it is appropriate that we return to it now as the metal has a number of instructive things to tell us about minor metals. As mentioned above, tantalum is used by the electronics industry, particularly mobile phone manufacturers, in capacitors which are used to control electric current in the device. As well as mobile phones, capacitors are used in PCs, DVD players and car electrical systems and consume between 60% and 80% of annual tantalum supply. As such, this is clearly a high growth area. The mobile phone industry represents about half of annual capacitor demand, and capacitors can also use niobium as a substitute. Other sources of demand for tantalum include superalloys, cemented carbides, and growing demand from computer memory chips and processors is expected. Also, as the metal has a very high melting point it is used in the furnace and chemical process industries.

This is an impressive list of potential high growth industries, and the worldwide explosion in the ownership of mobile phones in the late 90s fuelled a rash of tantalum exploration companies seeking funding and a public quote. Whilst the contract price of tantalum is thought to be around $45/lb, currently the market is extremely secretive about contract prices and supply is increasingly tight. At the height of the mobile phone induced excitement in 2000 the free market or spot price was around $250/lb. Producers with long term supply contracts would, however, have been locked into much lower prices then, perhaps in the $50/lb area. The nature of special minor metals is that customers must have security of supply because there is little or no spot market, unlike gold or copper. Mirroring that, miners must have secure contracts with a price guarantee.

When demand for tantalum, which has a record of fairly violent price swings, started to expand in the late 90s powered increasingly by the mobile phone revolution, it directly led to the incorporation of a number of small new mining companies who had acquired tantalum prospects and needed funds to explore their leases. Most of the projects were already known as prospective for tantalum, and some of them had had work done on them in the past. One of the more robust of these companies was Angus & Ross, a UK company which had the backing of major tantalum user, Cabot Corp of the US. Its Greenland project gained sufficient market attention to see the A&R share price rise from around 5p to 25p in early 2002 before plunging back to around 4p a few months later as the tantalum/mobile phone bubble burst. More recently its shares have rallied on the back of plans to re-open the Black Angel zinc/lead mine in Greenland.

The world's largest tantalum producer and one time gold miner, Australia's Sons of Gwalia, is in administration following its collapse in 2003 caused by its gold hedge book – perversely going heavily into the red due to a soaring gold price. The company's two tantalum mines continue to operate but at reduced levels of production pending the resolution of a number of legal actions relating to its gold problems.

The lessons of tantalum

Although the tantalum story is getting on for ten years old now, its lessons remain relevant in today's sometimes frantic metals market, and they are applicable right across the mining board. If you are interested in a minor metal, timing is vital, for often the time between price bubbles can be long and the shares you own will at best go nowhere. Minor metals such as molybdenum have had a tremendous run over the last couple of years, largely as a result of strong demand and stagnant treatment capacity rather than any shortage of moly ore. The potential for building price crushing capacity in the medium term is very real.

It is also critical to understand that some price levels in commodities can become so inflated that they take decades to be reached again – nickel at $8,500/tonne in 1968, sugar at £400/tonne in 1974 and gold at $850/oz in 1980 – are three examples of this, with sugar in the meantime never having been even close to its historic high, although nickel and more recently gold have done much better in this cycle. Unfortunately it is only time that will show us which metals reached destructive highs and which attained more rational highs the more easy to be surpassed in the next cycle.

The other problem with minor metal exploration companies is that after the bubble, to survive the hard times, they have to issue new shares, often at very low prices, with the result that the shareholder who buys at or close to the top, in the end can be diluted down to almost nothing.

All of this may seem obvious in hindsight but greed can be blinding at the time of investment. So, like Ulysses tied to the mast so he could not succumb to the Sirens, tantalum investors (perhaps *speculator* might be a more appropriate name) with good profits should have ignored those that urged them to hold positions for the long term. Quite marginal changes, or prospect of changes, in supply can have a disproportionate effect on the price of the metal and burst the price bubble, bringing the shares crashing down in its wake.

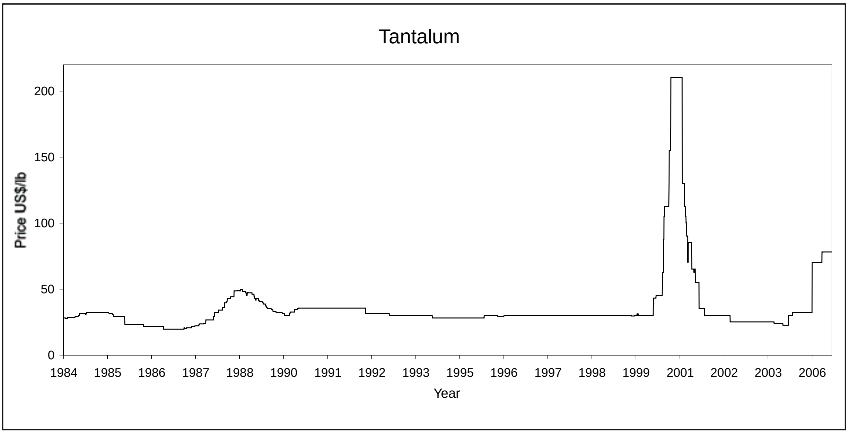
The fact that most business between miner and customer is done at a fixed contract price, so mine tantalum revenues may not be hugely affected by the spot price crashing, is of minor interest to a speculative market where a price bubble may have been seen by some as signalling a new and much higher price when supply contracts are re-negotiated in the future.

Table 1.14 Tantalum statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	850	40,000
Brazil	250	88,000
Canada	70	3,000
Congo	10	n/a
Ethiopia	70	n/a
Mozambique	70	n/a
Rwanda	60	n/a
Others	30	n/a
Total	1,410	131,000

Source: US Geological Survey

Chart 1.14 Tantalum



Source: Datastream

Cobalt

Cobalt is usually found as a by-product of copper, and central Africa, particularly Zambia and the Congo, is a major source of the metal. It is an important metal with uses as a strengthening alloy for steel and in magnets; it is also used in inks, paint and varnishes and as an isotope in radiotherapy. However, its fastest growing use is in rechargeable batteries, particularly those used in hybrid petrol/electric cars. Although demand for the metal is linked to the broad economic cycle, its price can be very volatile and the decline of the Zambian and Congo copper industries exacerbated that trend. In the late 70s and then again in the late 90s the price soared towards $40/lb only to crash back into single figures each time, and in the interim it showed plenty of volatility. The spectacular revival of both the Zambian and the Congo copper industries this decade has helped to steady cobalt prices which trade around $50 per lb helped by the inevitable growth in Chinese demand.

The lesson of Nkana dumps

One particularly vicious example of minor metal fatigue was Canadian incorporated Colossal Resources which had a cobalt re-treatment project in

Zambia based on the old cobalt rich dumps at the Nkana copper mine. Its share price soared in the mid 90s to over $20 before the project unthreaded and the shares fell back to mere cents. At the time the project looked highly attractive, with the cobalt price in one of its upsurges. The problem was that cobalt, like so many minor metals, has a paper thin spot market and most trade is done on the basis of long term contracts. Colossal, unfortunately, had first to offer its output to the parastatal company Zambia Consolidated Copper Mines (ZCCM), which was controlled by the Zambian government. If ZCCM did not want the metal then Colossal was free to sell it to other customers. Unfortunately the structure meant that Colossal could find it difficult to sign up long term customers because of ZCCM's effective pre-emptive right to the Nkana output. In the end, this structure, a falling cobalt price, and a fatal dispute over its ownership of the project, seriously damaged Colossal and its shareholders. A couple of years later the Nkana dumps project was acquired by South African major Avmin, but it had little better luck despite expectations of handsome returns from the operation. In 2003 Avmin wrote off its investment and sold its interest in the project. Some projects are simply fated and the new owners of the project, Chinese controlled Chambishi Metals, in 2006 suffered an explosion at the plant and had to shut it down temporarily.

The lesson to be drawn from the above is that cobalt is a typical feast and famine minor metal with high and consistent volatility. It is almost certain that if investors ride the cobalt cycle in a vehicle like Colossal they will need to get out or else their profits will turn to dust. Whilst this seems so obvious, it is an error repeated time and time again in mining booms, and indeed other stock market booms such as the early 2000s internet/high-tech bust.

The differential between mine production and potential reserves

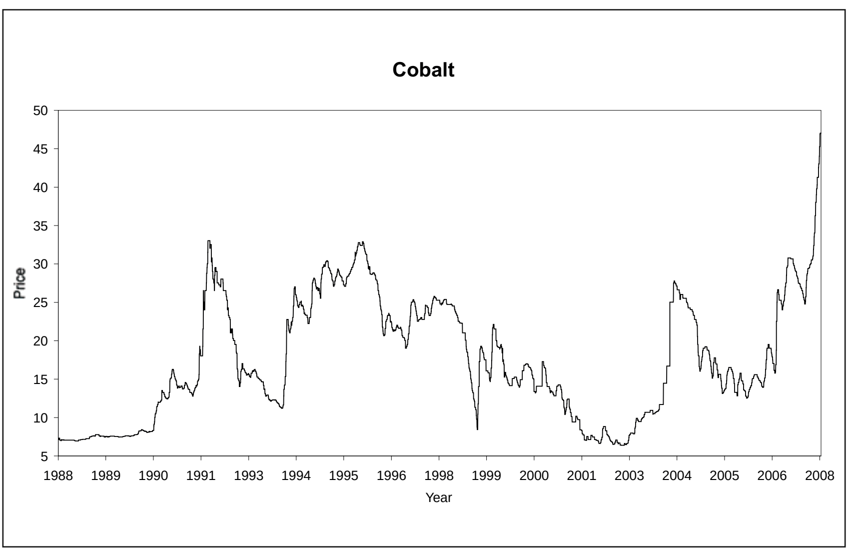
The following table shows a huge differential between mine production and potential reserves. This is due to the large amount of by-product cobalt tied up in nickel laterite deposits, many of which have not yet been mined economically. A large increase in the nickel price as we have experienced over the last few years therefore could threaten to bring substantial amounts of by-product cobalt onto the market if the nickel price rise leads to the development of these previously uneconomic deposits.

Table 1.15 Cobalt statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	7,500	1,400,000
Canada	8,000	120,000
Congo	22,500	3,400,000
Cuba	4,000	1,000,000
Russia	5,000	250,000
Zambia	7,000	270,000
Others	7,100	481,000
Total	61,100	6,921,000

Source: US Geological Survey

Chart 1.15 Cobalt



Source: Datastream

Tungsten

A metal with a broad array of uses, many of them strategic, tungsten is an object lesson in the problems that can occur in minor metals. Tungsten has a number of important properties including having the highest melting point of any metal, being exceptionally hard and also extremely heavy. This means that it is the favoured metal to be used in high temperature applications such as light bulb filaments, and, as tungsten carbide, is used extensively in cutting and drilling tools. It is also used widely in the armaments industry in the manufacture of armour plating and ammunition. However, the rising popularity for ecological reasons of low energy light bulbs, which do not use filaments, may well dent tungsten demand in the medium term. Ironically the rise of low energy light bulbs will increase the use of mercury, one of the most toxic metals, already being phased out of thermometer and barometer use because of this toxicity.

From time to time tungsten, which is mined in the form of scheelite or wolframite ore, is subject to sharp price fluctuations as is common with minor metals. The tungsten price is measured in metric tonne units (MTUs). In the mid 70s, a time of high international political tension and high inflation, tungsten sold at $175/MTU. Over the next 15 years it slithered lower and lower until in the early 90s it touched $25, before recovering to $45 later in the decade. Today, tungsten stands at around $175 again. The historic weakness of the metal was due to the large strategic stockpiles held by the US, Russia (and the old CSI states), and China. These stockpiles are thought to have shrunk over the last couple of years and indeed China is trying to restrict production and export levels of tungsten. With western production held back by the poor long-term price record, a large deficit of demand over new mine supply is common.

Betting on the tungsten overhang

Intermittently, mining companies with tungsten interests come to the fore. In the 70s it was Australia's Peko Wallsend which amongst its diversified interests owned the King Island Scheelite mine, and for a time did extremely well from the high metal prices reigning then. In the late 90s the small UK mining group Avocet built up a portfolio of tungsten mining and marketing interests on the back of expectations that stockpile disposals were coming to an end and that the mined supply deficit would lead to a sustained improvement in the tungsten price. The price rise did not come through, as Chinese material in particular continued to reach western markets and Avocet was forced to shut down a substantial part of its tungsten operations and eventually sell the rest. Its own situation was made worse by problems at its Malaysian gold mine (now overcome) at a time of gold price weakness.

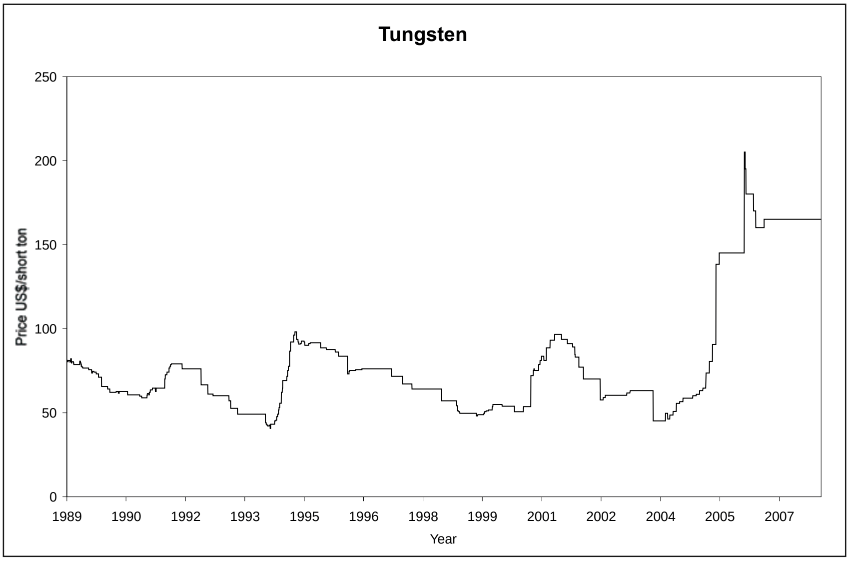
The lesson that tungsten teaches us is that even the most closely watched metal markets can fail to give up key secrets, and that intelligent and detailed research, as has been available on tungsten for many years, can give the wrong guidance if it is based on incomplete figures. Those who supported Avocet came very close to losing everything as the shares plummeted from around 160p in 1997, to 11p in 2002 when it abandoned its main UK listing and moved to AIM. Avocet added insult to injury when, having re-invented itself as a focused gold miner, it froze existing small shareholders out of an attractive financing in 2003 by changing the percentage of shares it could issue to outside investors without an open offer to shareholders.

Table 1.16 Tungsten statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Austria	1,300	10,000
Bolivia	870	53,000
Canada	2,600	260,000
China	77,000	1,800,000
North Korea	600	n/a
Portugal	800	4,700
Russia	4,400	250,000
Others	2,040	420,000
Total	89,610	2,797,700

Source: US Geological Survey

Chart 1.16 Tungsten



Source: Datastream

Magnesium

We have included magnesium in this review of minor metals because picking the major metals of the future – and magnesium may be one of them – can be enormously rewarding, especially as changes of status amongst metals happen sparingly and gradually. It is also the case that new metals, in the form of newly discovered elements, are extremely rare so an upwardly mobile minor metal will certainly be already known to metal markets. Magnesium has been in commercial use for decades. Its main usages now are in aluminium alloying, iron and steel, and in die-casting, with the motor industry being the main consumer here. It also has a number of other uses in chemicals and wrought products.

A future major metal?

Its prospective role as a future major metal relates to its combination of lightness and malleability. In the past it has been well known for its uses in relieving stomach ailments in the form of milk of magnesia, and in flash bulbs, flares and fireworks, but these are now hardly growth areas. Interestingly it was used by the German car industry in the 30s in the manufacture of engine blocks, where its lightness combined with great stability when hot was of particular benefit. That usage, however, died out after the Second World War and has only relatively recently been revived. One of the metal's growth areas is magnesium sheet metal which is used increasingly in the manufacture of products such as computer casings, digital cameras and mobile phones. Other, potentially more substantial, uses are being looked at for magnesium sheet metal, with car bodies a prime long term target.

Currently the major producers of magnesium are China, western smelters, Russia and the ex CIS. China is a large force producing 35% of the world's primary magnesium. (The difference between this figure and the one in the following table relates to the fact that magnesite production statistics are used, not magnesium. Magnesite goes into magnesium compounds such as oxide used primarily in making refractory products and in agriculture and construction. Magnesium metal is used in alloying aluminium products and also in car and machinery components.)

Magnesium's future appears to be based on the application of appropriate treatment technology to new projects. The consequent ability to scale up production at low cost and provide significantly increased supply is particularly critical in the light of the potential of the sheet metal sector. Unfortunately two Australian magnesium developers, Magnesium International and Australian Magnesium, have been working on two new major magnesium projects for some years with little success.

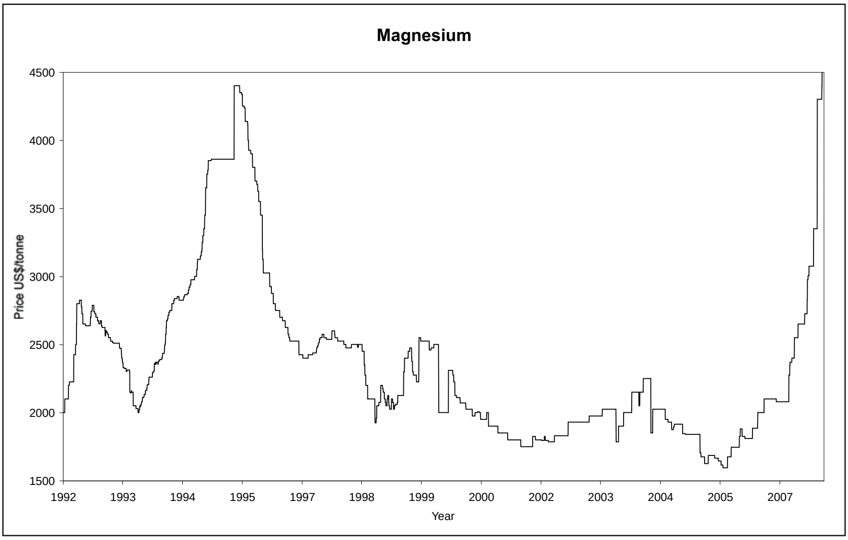
Table 1.17 Magnesite statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	140,000	100,000,000
Austria	200,000	15,000,000
Brazil	110,000	45,000,000
China	1,870,000	380,000,000
Greece	150,000	30,000,000
India	105,000	14,000,000
North Korea	350,000	450,000,000
Russia	350,000	650,000,000
Slovakia	115,000	45,000,000
Spain	150,000	10,000,000
Turkey	930,000	65,000,000
Others	120,000	390,000,000
Total	4,590,000	2,194,000,000

Source: US Geological Survey

Note: The tonnes metal refers to the amount of magnesium metal present in the ore.

Chart 1.17 Magnesium



Source: Datastream

Other minor metals

Amongst the other minor metals where publicly listed mining companies have, or have had, significant exposure are manganese, molybdenum, chrome, titanium, cadmium, and antimony. Occasionally there can be an uplift of interest in some of these metals, and molybdenum, for example, has had a very strong run in the last couple of years as the steel industry has boomed. Despite this kind of incentive an investor would have to have a high level of knowledge, either of the minor metal or of the mining company involved, to make it worthwhile to have a go in what is a highly specialised area. The level of information attached to one of the major metals like gold and to the big diversified mining groups is extensive; whereas minor metals and their miners are far less easy to follow. We will return later to the issue of information and how well mining is served in this area.

It is also often the case that when the mining sector is having an extended run, as it did in the early 70s and the mid 80s, minor metals as a group may run later in the cycle than their ‘elders and betters’. In such circumstances a promising story may not come to the fore until insiders have positioned themselves and the situation is ripe for wider dissemination of the story. In that case an interesting minor metal situation may come too late for newcomers to make much money from it, if any at all, and that all they will be doing is providing an exit for the insiders. Elements of this were observable in the rise and fall of tantalum in the late 90s. Currently quite a number of prospective mining projects are being touted in the minor metals area. A great deal of caution is, therefore, required in becoming involved in the minor metal sector.

Non-metals

Energy minerals

The scope of this book does not include oil and gas, huge subjects in their own right, but the main energy minerals which are mined, coal and uranium, have a major position in the world of mining.

We have also left out tar sands, that gluey half-liquid, half-mineral substance rich in trapped oil, where Canada has the world's largest deposits. Tar sands have been around for many years and progress in economically processing the substance has been the subject of huge amounts of research and development spending. With the oil price holding well above $60, a substantial investment programme in Canada is leading to a major increase in tar sands production. I have also ignored oil shales where the US has the largest deposits. Shales are conceptually similar to tar sands and need further research on the issue of optimising the economics of treatment, although there is some commercial production in Estonia and Brazil.

Coal

Coal is found in virtually every country in the world and a century ago it was the prime source of energy fuelling the rapidly expanding electricity industry, the economically dominant iron and steel industry, and also the heating of homes worldwide. Today the power stations that produce electricity can as easily be fired by oil, natural gas, hydro-dynamics and nuclear as by coal, and there is an increasing green element in electricity production in the form of wind and sea power. Coal-fired power stations are, however, relatively quick and straightforward to build, and indeed China's present growth rate is sustained by a massive coal power construction programme. The problem with this approach, certainly as far as the advanced world is concerned, is the issue of pollution caused by the 'dirty' nature of coal power station emissions. But the availability of huge coal resources compared with oil and gas makes coal attractive, and technological advances in the area of emission control such as scrubbers could push coal back towards centre stage in due course.

Away from power station consumption the iron and steel industries, although still important, no long occupy the commanding heights of the global economy and coal-fired furnaces are now just one way of making steel. Heating homes with coal is now a very minor practice in this age of central heating, particularly in the advanced world. However, domestic coal fires are now being marketed as a designer concept in the UK and sales of coal for this purpose have now begun to expand again, albeit from a very low base.

Main producers

The main coal producers are China, Russia, the US, Poland, Australia, Colombia, and South Africa, the latter three being substantial exporters as well; but many other countries also produce coal, often for domestic power station consumption. The world's leading diversified mining companies, the UK big four, are all major coal producers, with Rio Tinto being the biggest in terms of turnover.

Coal is produced both from underground mines, some of which are relatively shallow drift mines, and opencast surface mines. Over the years coal has acquired a somewhat negative image with some deep level underground mining having a poor safety record, additional health risks from airborne coal dust, and surface mining often being portrayed as environmentally damaging. It is the case that in recent times both China and Russia have experienced a number of major underground coal mine disasters with substantial loss of life.

Coal like so many commodities is subject to cyclical fluctuations, and the links with electric power and steel make it particularly sensitive to economic growth rates. This cyclicality is, therefore, relatively straightforward to monitor and often manifests itself, for example, in the sometimes vigorous price contract negotiations between the Australian coal producers and their prime customers, the Japanese steel producers and electricity utilities and of course China.

Independently quoted coal producers disappearing due to industry rationalisation

Some years ago there were a number of interesting independently quoted coal stocks in South Africa, Australia, the US and Canada. If you were able to read the coal cycle, trading the stocks was often very rewarding and they were all accustomed to paying out good dividends. One of the most interesting of these cyclical vehicles was South Africa's Amcoal controlled by Anglo American, then a South African registered company. Amcoal itself had been formed in 1975 from four listed and four unlisted coal companies. It had large export contracts priced in US dollars but had local SA rand costs, and its dividend record was progressive despite the cyclical nature of the industry. In due course Anglo American acquired the whole of Amcoal's capital and the company disappeared from the stock market.

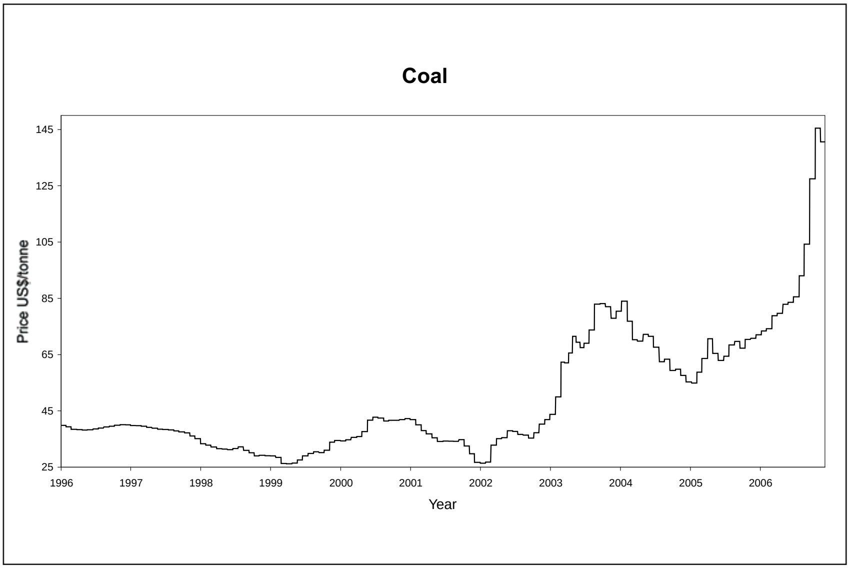
This kind of rationalisation became a global trend and other independently quoted coal producers were also taken over by the diversified giants. In the end the strong distributable cash flows of the coal producers became too juicy a target for the big diversifieds to ignore, and this has reduced the number of coal companies which remain separately listed. In the US, Peabody and Arch are two of the biggest listed producers. However, for the moment coal remains a mineral where investors will find it easier to participate through a diversified company like Anglo American, or Xstrata whose historically prominent coal earnings have, though, been diluted by other metal interests following its recent string of acquisitions.

Table 1.18 Coal statistics (2007)

	Production (million tonnes) oil equivalent	Reserves (million tonnes)
Australia	215	76,600
China	1,290	114,500
Germany	52	6,708
India	108	4,328
Indonesia	195	4,988
Poland	62	7,502
Russia	148	157,010
South Africa	152	48,000
USA	587	242,721
Others	341	133,621
Total	6,272	847,488

Source: BP Global Energy Review

Chart 1.18 Coal



Source: Datastream

Uranium

Energy minerals, including oil, can be highly controversial. Their use is often judged to damage the environment, the mining of them can be both dangerous and also lead to pollution, and in the case of uranium there is the added hazard of risk to health from exposure to radiation as well as the problem of disposing of nuclear waste which is highly toxic. Having said that, after years in the wilderness uranium is back centre stage in the search for clean power, as nuclear power stations do not give off carbon emissions – the current *bête noire* of the environmental lobby.

By far the largest customer for uranium is the electricity power generating industry, although planning permission to build new nuclear power stations is still a long process. France has the largest exposure to nuclear power as a percentage of its generating capacity. Interestingly the developing enthusiasm for nuclear power has emerged only in the last couple of years, as at the beginning of the millennium the general view was that it did not have much of a long term future. Since then it has staged a remarkable comeback due to the rising problem of carbon emissions from conventional coal-fired power stations.

The power station story is not a given

However this comeback from zero to hero in the space of a few years needs to be viewed with the greatest of care. The price of uranium, which had been stuck below $10 per lb for years, partly as a result of continuing sales of material no longer needed for nuclear weapons, reached $17 in 2004 and since then has risen rapidly to around $150, although recently it has fallen back sharply. Despite that, some commentators are saying that $200 is just a matter of time and a four figure price a longer term possibility. This sounds exciting but there are severe problems medium term with this scenario. The price excitement is driven by dwindling secondary stockpiles and new mine supply lagging behind demand from power stations. Some new nuclear power stations are being built, but the real or perceived excitement lies in the carbon cleanliness of nuclear power and its role in replacing old dirty coal plants over the longer term. Fair enough, but there are a number of wrinkles to consider. Nuclear power stations require long extended periods of consultation before new ones can get planning consent, and within this process there is the technological issue of the system to be used in generating the power. Nuclear stations are habitually late in terms of both design and building, usually going way over budget. The current excitement is based on the large number of new nuclear plants planned but this list stretches way into the future beyond 2015, and in the meantime many older stations will be closing down. The chances of the new plants coming on stream on time is low, and if clean coal technology makes progress, countries in a hurry like China and India may well leaven their long term future power demands with more coal than uranium supporters may currently have factored into their figures.

Uranium is not a scarce resource

But uranium problems do not end with the power station issue. Those investors pursuing the rising number of prospective producers and, in particular, explorers should remember that uranium is one of the most common elements around, and if the price does match the superbulls' hopes a potentially massive increase in new mine output looms. The Australian Government has recently dropped the ban on new uranium developments in Australia, which is already a large producer and has a number of sizeable but dormant mines like Jabiluka, ready to come on stream over the next few years. There are also many known undeveloped uranium deposits around the world, and also many highly prospective but unexplored areas, all now beginning to attract the attention of promoters. There are also the by-product producers like South Africa whose gold mines also have uranium in their ore which has been profitably treated in the past. Furthermore, it is also important to remember that the current sky high prices relate to relatively small scale transactions where certain consumers, in a very tight market, need small quantities of uranium for immediate delivery. If the nuclear industry does expand massively, negotiations for long term supplies will revert to contract price levels providing both miner and consumer with secure product and secure prices. Since there will be no shortage of new producers at current price levels, long term contracts are unlikely to be fixed at anything like the expected elevated levels towards and beyond $200/lb.

An example of the problems relating to what enthusiasts call uranium's new paradigm is the situation in the US. It has a large number of nuclear power stations representing about 20% of total US power generated, but only 6% of the uranium used annually in these stations comes from US mines. However, with spot prices over $100 the US has huge low grade uranium resources which can be accessed profitably at production costs of around $35. Some of these resources can be mined by using a technique called In Situ Recovery (ISR) which uses water pumped under high pressure with oxygen or carbon dioxide to extract uranium from the rock in which it is trapped. If the uranium price remains at current levels US production has the potential to take off vertically.

Additionally, investors should remember that at one time in the early 70s, at the end of the Australian nickel boom as mentioned earlier, uranium discoveries in the Northern Territory ignited a new flurry of excitement first in the shape of Queensland Mines and later Pancontinental Mining. A large amount of money was made and then lost as these promising discoveries fired a speculative mini boom. The boom finally broke on the rock of worries about long term uranium demand and local political obstruction, not to mention, in the case of Queensland, a rather over-optimistic assessment of the richness of its discovery. Having said that, the current uranium excitement is rather more extensive and worldwide than that localised boom in the 70s. Consequently if the current bubble bursts (probably this time round due to supply factors rather than demand) investors need to be aware that the fallout could be very unpleasant.

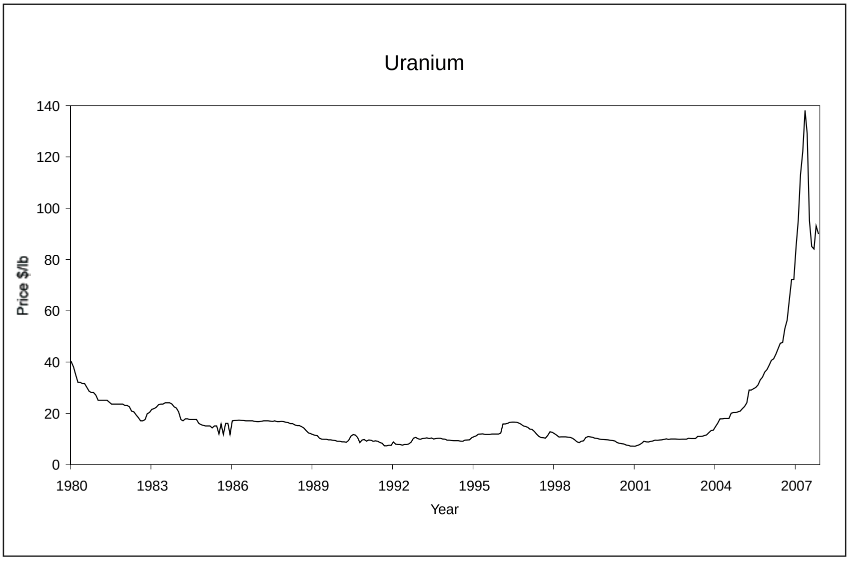
Table 1.19 Uranium statistics (2007)

	Production uranium (thousand tonnes)	Reserves uranium (thousand tonnes)
Australia	7,593	1,143
Canada	9,862	444
China	750	60
Kazakhstan	5,279	816
Namibia	3,067	282
Niger	3,434	225
Russia	3,262	172
South Africa	534	341
Ukraine	800	90
USA	1,672	342
Uzbekistan	2,260	116
Others	916	712
Total	39,429	4,743

Sources: WNA Market Report, OECD, NEA & IAEA

Note: Production is 2006, reserves 2007.

Chart 1.19 Uranium



Source: Datastream

Industrial minerals

The last broad category we will look at is industrial minerals. This sector could also include minerals such as sand and gravel, limestone and clay, but these raw materials are most closely associated with the building industry and their value added is often minimal. In addition, producers appear in construction share portfolios not in mining portfolios, so they have been left out.

Industrial minerals are often found in the form of ‘soft’ ore, i.e. crumbly and in many cases having the consistency of sand. These minerals can be used in the manufacture of chemicals such as fertilisers (sulphur, potash and phosphates) or products such as ceramics (zirconium sand), detergents (borax), and oil industry drilling mud (barytes). One of the fastest growing minerals in this general category 30 years ago was asbestos, which had wide application in building, protective clothing, car parts and paper. Today its use is heavily controlled and demand has fallen sharply. It is rarely used in the West, but production and consumption in countries such as China and Russia remains quite healthy. Ironically the prejudice against asbestos has similarities with that which almost overwhelmed uranium. Whilst not forecasting a revival in asbestos’s fortunes to match uranium, it is interesting to note that some commentators dispute that the far more commonly used white asbestos is damaging to health, unlike its deadly cousins, blue and brown asbestos.

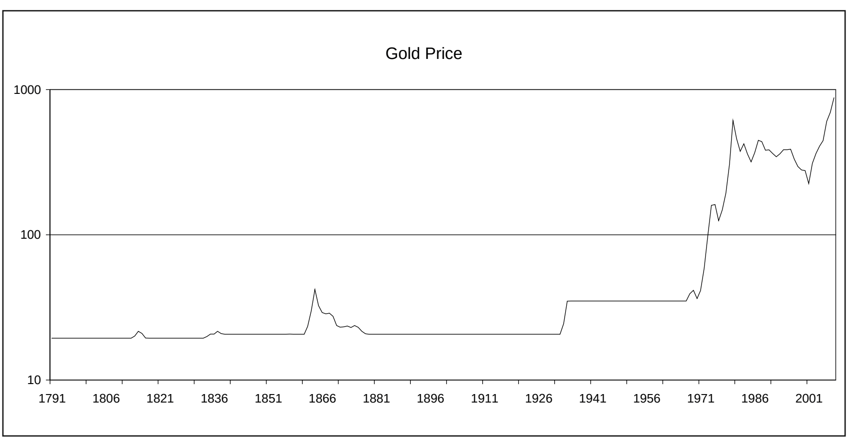
In the past this area of mining has attracted sporadic investor interest, but it shares many of the same problems with regard to information, and transparency in pricing the minerals, as minor metals. Many of them are, like coal, sold on the basis of fixed contract prices, although these do vary over time and are affected by new producers and the economic cycle. It is not unknown for mining companies to build their long term structures on these bulk minerals. Freeport Sulphur and Texas Gulf Sulphur of the US both became large diversified mining groups on the back of the cashflows generated by their traditional sulphur operations. Texas Gulf in the end was taken over by Elf Aquitaine Oil in 1981, and Freeport eventually broke itself up and distributed its operating parts to shareholders in the 80s.

Because these minerals are often mined/produced in substantial quantities, tens of millions of tonnes in the case of sulphur and phosphates for example, relatively small price adjustments can have a significant effect on a company's profits. But some of these minerals also display greater stability in terms of generating profits than the more glamorous precious and base metals, and Rio Tinto, for instance, has had occasion to thank its unglamorous but steady US Borax operations for countering weak base metal returns a number of times in the past. However, taken all in all I think that, as with most minor metals, the ability of equity investors to do well out of industrial minerals situations is limited.

Gold

I believe that gold is such a key part of the mining sector that it deserves a section all to itself. Its history is littered with world shattering events like the gold rushes of the nineteenth century in the US, Canada and Australia; and one of that century's most vicious wars, the Boer War, was ignited by British determination to control the new gold mines of South Africa. Centuries before, the Spanish had raped and pillaged their way through Central and South America in pursuit of gold and silver and the fabled city of Eldorado. Some of the most dramatic stock market scams have centred around gold and some of the greatest triumphs too. In everyday language we use gold allusions like "heart of gold", "good as gold", "it's a gold mine", "safe as Fort Knox" (where the US gold hoard is stored), and "gold plated" to describe situations in approving tones. Banks also issue gold credit and debit cards to particularly well-heeled customers. Yet between 1980 and 2000 gold seemed to sink into a coma, attracting little general interest, sustained only by a tight group of supporters whose knowledge of gold's history, and its frequent relapses, encouraged them to exercise patience, certain in the knowledge that gold would eventually revive. That gold broke through $1,000 in March 2008 is some reward for their patience and faith.

Chart 1.20 Long term chart of the gold price



Source: Datastream

Monetary gold

The subject of gold is a large one and over the years many books have been written about the metal which John Maynard Keynes described as a "barbarous relic". In the nineteenth century, and for part of the twentieth, gold was at the centre of the monetary system because of the gold standard. For centuries it was used as money in the form of coin, and countries stored their monetary reserves in the form of gold bar. In due course gold came to be seen as too heavy, in terms of value, and cumbersome, as commercial activity exploded and personal transactions increasingly required change to be given. Coins using other metals were struck carrying values very much lower than was the case with gold coins, and this provided necessary flexibility for personal transactions. In such an environment the birth of paper was a boon to governments and banks as it enabled them to introduce paper money, although to begin with issued banknotes had to be backed by gold, a requirement long since dispensed with.

The role of central banks

Over the last twenty or so years many (but not all) central banks have begun to sell off their gold reserves and concentrate foreign currency reserve holdings in US dollars, Japanese yen, more recently the Eurozone euro and even much derided but still robust UK sterling. Included in those central banks who have sold large amounts of gold are the Bank of England (although the decision to sell was taken by the UK government) and the Swiss central bank. More recently Spain has also been a seller, its central bank governor rather mystifyingly stating that bonds, into which the gold sales proceeds were invested, were more profitable than gold. Those that have not sold gold, like the effectively defunct German Bundesbank, are thought to have leant out large quantities of their holdings to support the burgeoning derivatives market in gold, of which more later.

However, whilst gold has been downgraded in the international monetary system it has not disappeared completely. The European Central Bank has a gold component in its reserves, France retains a large gold reserve, and the

US has the largest declared gold reserve holding and, perhaps because its currency, the dollar, is the prime reserve currency, it has very little in the way of foreign currency reserves. It is also becoming clear that growing giants like China are acquiring gold reserves, as is Russia whose gold mining industry, after decades of neglect, is now expanding.

The issue of the future of central bank gold holdings is one that divides opinion. Some gold market observers still believe that over the long term gold will, like silver a century or more ago, disappear from central bank reserves. Other commentators, particularly gold bugs in the US, believe in stark contrast that in time gold will regain its central position in the monetary system as the excesses of money and debt creation over the last twenty years finally undermine the integrity of the system. In the meantime gold, if it is no longer seen as money, is still seen in some quarters as having investment qualities, and its industrial role as the prime precious metal used in jewellery offers steady long term growth potential.

Investing in gold

Our main concern in this book is to steer investors through the mining share market, and the gold share sector has always offered an encouraging number of choices. However, investors in particular have in the past dabbled in physical gold whether by buying gold coins such as *Krugerrands* and *Sovereigns*, or gold in bar form, so a brief mention here is appropriate.

Physical gold

One of the characteristics of gold that makes it an investment vehicle is the fact that it is high value for low weight, as people fleeing revolution with only one (strong) suitcase have found to their advantage. It is also very easy to store as it is very dense, consequently its weight is compacted into a small dimension. So a 400oz bar measuring, in 'old money', around 7x3x3 inches, is worth $340,000 (at $850/oz). If you carried the same amount of wealth in the form of copper you would need to plan for a substantial lorry to carry the

50 tonnes or so – not much good if you're in a hurry to catch the last plane out of Saigon, for example.

Gold broadly can be bought for physical delivery or for storage in a secure warehouse. There are a number of specialist gold and gold coin dealers who will take small orders, although the bullion banks are after wealthy customers only. In the UK in the 70s the clearing banks dealt in gold coins in small numbers for their customers but this service has largely been discontinued. The other method of dealing in gold is through holding *certified gold*. In essence that means that specific gold bars are not allocated to a buyer, but he receives a certificate stating the amount of gold that constitutes the liability of the bank (usually one of the bullion banks) to him.

Gold exchange traded funds

In 2003 the World Gold Council launched a gold investment product, the now named *Lyxor Gold Bullion Securities* (code: GBS), which is listed on the London Stock Exchange and provides investors with an easy and cheap way of investing in gold. The security is backed by a fixed amount of gold on the basis of around one tenth of an oz per share. The gold exists physically in allocated form and is thus the property of the gold fund shareholders, although initially there was some debate as to how physical the gold was in the hands of the Fund's custodians. Dealing costs are relatively low at 0.4% per trade. The shares are listed in the *Financial Times* under Exchange Traded Commodities and appear to trade at a slight premium to the underlying gold value. The fund of gold was valued at around £1.3 billion in June 2008, and daily volume in value is usually over £3 million. ETF Securities also has a gold ETC fund (code: PHAU).

There are also other gold funds in the form of exchange traded funds available in other markets, the biggest in the world is the SPDR(R) Gold Shares (GLD) (invested in bullion not gold shares) in the US. There are also bullion funds in Australia and Canada and in other centres, but any prospective investor needs to look at the structure of the fund as not all of them hold physical gold, some may simply be paper promises based, of course, on gold price movements but not actually backed by gold.

Gold derivatives

Investors in gold can also spice up their exposure by using the derivatives market to obtain greater reward from gold price changes. One route is the purchase of options giving the investor the right to buy (or sell) at a fixed price at some time in the future. The investor puts down a relatively small amount of money to secure the option and if he has bet correctly can enjoy a return far greater than an investment directly in gold itself. Using the options market is, however, very much taking the paper gold route, and there must always be the concern that the counterparty may not be able to honour his side of the trade in extreme circumstances. Although in most cases the option would trade on an exchange and the exchange should guarantee the contract.

There is quite a philosophical divide on the customer side in the gold investment world.

- Some potential investors buy because they think **gold is cheap** and they will make money. They do not intend to hold their gold for ever, and are simply looking for a decent turn on their purchase price. They tend, therefore, to buy gold in certified form which is cheaper than buying specifically allocated gold. It also simplifies the process of buying and selling because a book entry is all that is needed to complete the deal.
- For others, dealing in gold has a much more **mystical significance** and they not only want to deal in physical gold they also want to take delivery and store it themselves. Taking delivery can literally mean having it delivered to the buyer who then holds it in a safe or secretes it in a secure place; more normally such a buyer will probably put it in a personal bank deposit box. When buying coins it is usual to take personal delivery, and there are also small, low weight gold bars or wafers which are mostly purchased for personal keeping.

A matter of trust

The other key point to make about gold is that many investors buy the metal because they no longer trust their government, trust the international financial system, or trust more conventional forms of investment including bank deposits. This latter issue galvanised Japanese citizens to cash in their bank deposits, when government insurance of such deposits was materially scaled down in 2002. In place of their deposits, which under the regime of negligible interest rates were providing little income, many Japanese bought gold bars and coins and took delivery. The withdrawal of government insurance cover came at a time of rising concern about the solvency of Japanese banks, and gold seemed like a solid alternative.

Investor scepticism about government attitudes to gold is rooted in the past and one example will suffice. In the 30s, as the US government of Franklin Roosevelt grappled with the Depression, it was decided to use gold as a means of bolstering prices at a time of chronic deflation, in particular farm produce prices. To this end the price of gold was raised to $35/oz in 1934. Before that, in 1933, Roosevelt controversially through the Emergency Banking Act ordered all gold, gold coins and gold certificates held by US citizens to be handed in to the Federal Reserve in exchange for paper dollars or dollar deposits. There are various estimates of how much gold actually was surrendered, but any gold known to the authorities, like gold certificates and gold held to customer accounts in banks, would have been automatically handed over. US citizens only recovered the right to own gold in 1975, but in the interim many had clearly bought it and stored it overseas, as the price of gold, strong ahead of the lifting of the ban, fell sharply afterwards as demand failed to materialise.

Gold, then, has an important role as a safe haven investment and though many governments these days claim to have little or no interest in it, sceptical supporters of gold believe that if financial chaos was to return then the view of governments could easily change. So to avoid the danger of a Roosevelt-style enforced confiscation of gold, the best thing to do is store your gold yourself. You then have the choice whether to comply with government dictum or not. Of course what you would be doing would be unlawful and there might well be records that could trace the gold purchase back to you. Also, if at some time you wanted to sell your gold it would have to be done unofficially with the likely consequence that a discount to the market price would have to be accepted.

What drives gold

Since the great inflation of the 70s and 80s the general investment view has been that gold is a hedge against inflation and that's about it. In fact there are other influences, some financial and some political, which have an historic influence on the gold market, and indeed as we saw above, a period of deflation can also be helpful in certain circumstances.

Although it was the effect of inflation in the 70s that is credited with pushing gold from $35/oz at the start of the decade to $850/oz by January 1980, there were other reasons. Perhaps the most important was the fact that gold had remained fixed at the $35 level since Roosevelt's decision in 1934. The central banks, in effect, as buyers and sellers maintained that price until the US, who had sold their gold reserves down from around 22,000 tonnes after the Second World War to around 8,000 tonnes in 1971, closed their gold sales window. Without central bank intervention the price immediately began to move ahead, a trend that continued for the next ten years. So central bank intervention in the gold market proved in the end to have held back the gold price rather than supported it.

Tension in the Middle East

The effective fixing of the gold price had also inhibited the development of new gold mines, a situation which continued until the 80s. This meant that once the central banks had withdrawn from the market, newly mined gold was unable to keep pace with demand, forcing the price higher. The 1973 Arab-Israeli War triggered a major rise in the oil price which had a serious effect on price levels generally, and the rate of inflation, which had been rising for several years, exploded. In such circumstances gold once more came to be seen as a store of value and a hedge against the falling purchasing power of money. The latter years of the 70s saw further financial and political turmoil. Inflation was still surging along and a string of disturbing events culminated in 1979 with the US Embassy hostage crisis in Iran, and in 1980 with the Soviet invasion of Afghanistan and the Iran-Iraq War. During this time the US dollar was weak against both the German mark and the Japanese yen, which further supported the gold price.

The Middle East and near Asia were at flashpoint throughout the period, causing great volatility in the oil market and to the oil price. The inflationary implications of a rising oil price and thus the knock-on effect on gold continued to affect the yellow metal's price, and that remains the case today with tension over Iran's nuclear ambitions attracting political hedge-type buying of gold. During the 80s and the 90s, however, the actual effect gradually became much less marked due to investor expectations that any real supply threat to oil was much exaggerated. As a consequence both oil and gold prices deteriorated seriously. Today there are clear signs that many market participants have begun to factor in much higher prices for these two 'marker' commodities than many industry professionals.

Political upheavals may once more be affecting gold

One of the main contrasts in gold market sentiment between the 70s and the 90s was the way that gold reacted to political crises. If the World Trade Center had been attacked in the late 70s there would have been a huge rise in the gold price, in 2001 the rise was modest and contained. The actions of the Soviet Union in the gold market were of prime interest to gold analysts in the past, so if there was a good harvest investors would buy gold because gold market supply would be squeezed as the Soviets would not need to sell any of their reserves to fund food imports.

The issue of official sales, which essentially are sales from reserves by central banks, was important in the 70s and 80s and retains its importance today. The difference is that whilst gold demand has risen materially over the years, particularly for jewellery, the combination of the expansion of mine output in the 80s and 90s, which had been stimulated by the 70s price surge and central bank selling and lending, effectively capped the gold price.

Since 2001 the gold price has begun to dance to a different tune. The rise in commodity prices, particularly but not exclusively oil, spurred by China and India, but others also, has led to fears of inflation again. The US dollar has been weak on the back of US Government deficits, further boosting gold. Whilst the Central Banks continue to sell gold the market is now a ready absorber as doubts rise about the Banks' ability to sustain these offerings. At the same time the potential of China, India and Russia as buyers helps market sentiment. There are also signs that political tension like that generated by the Iranian nuclear programme is once again leading to gold buying. The supply/demand equation has also been changing, with new mine supply struggling to remain stable at best.

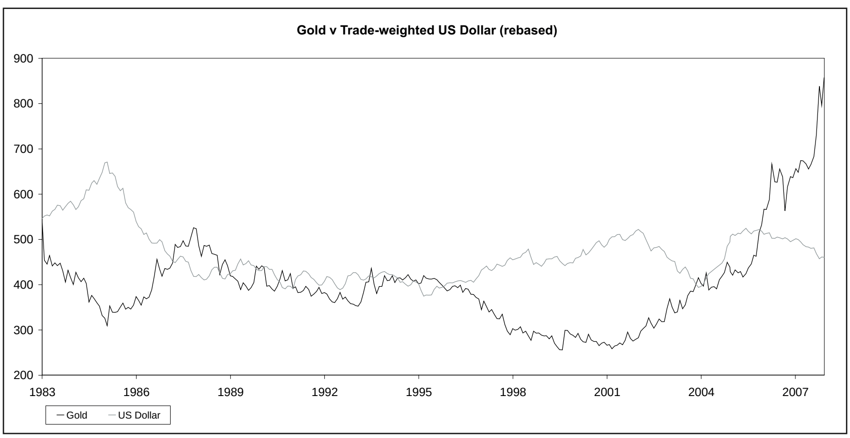
Hedging

Hedging, a subject which crops up in other parts of this book, has also had a significant effect in the past on the gold price as mines have often been the final customer for central bank gold lending mentioned above. By borrowing gold and then selling it forward, mines are able to lock in a higher future price, the mechanics being that gold borrowing is very cheap and throughout the last decade funds so borrowed could be put on deposit at high interest rates. When the borrowed gold had to be returned the mine could deliver its own gold, keeping the profit it had made on its 'round tripping' of interest rates. Of course this strategy meant that mines were selling hoarded central bank gold as well as their own current production which led to an expansion of supply to the market, and this had a negative effect on the gold price itself. Over time, hedging strategies have become highly sophisticated, some would say dangerously so, replacing the initially simple forward sale described above. But with strong signs that hedging is on the wane and central bank selling and lending also much reduced, one of the contemporary gold market's most potent negative influences has now begun to reverse itself.

Relationship with the US dollar

Perhaps the greatest continuing influence on the gold price has been the US dollar. During the 70s and 80s it was seen as a weak currency against the mark and the yen, the currencies of the then rising economic giants of Germany and Japan, but liquidity in these two currencies was poor and the UK pound, where there was reasonable liquidity, was for the most part as weak as the dollar. Gold was a natural substitute for the greenback, especially when investors realised that it had broken clear of its own imprisonment within the central bank intervention system which lasted from 1934 until 1971. Indeed, when Ronald Reagan became US president he strongly believed that the relative economic decline of the US, which could be traced back to the Vietnam War, was mirrored in the weakness of the dollar. Since nothing signified that weakness as clearly to world markets as the countervailing strength of gold, a return to a strong dollar must inevitably lead to the undermining of gold.

Chart 1.21 Gold v Trade-weighted US Dollar



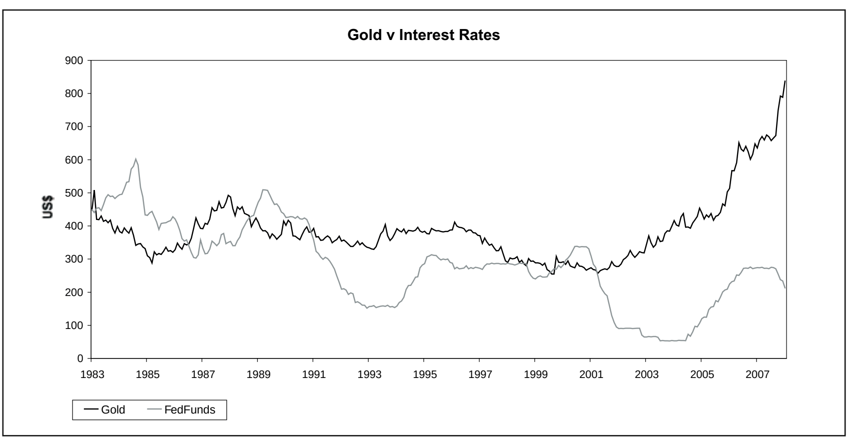
Source: Datastream

Until 2003 gold drifted as the dollar prospered. In the US there are supporters of gold who believe that during the 80s and 90s the authorities intervened against gold, lending and selling metal from their own vaults to keep the price low, and even supporting this action in the fast expanding derivatives market. Indeed, with far less success, they believe this is still going on today. Foremost amongst the groups harrying the US authorities over this issue is the Gold Anti-Trust Action Committee (GATA) who believe the weakness in gold has been critical in pointing out the dollar's superiority as a reserve asset. During this extended period of dollar strength the US has, as a consequence, built up a huge deficit on its external account with the rest of the world, which now throws into doubt the wisdom of the policy of seeking a strong dollar at any price. With the dollar in retreat the standing of gold has been materially enhanced.

Interest rates

Alongside the dollar the level of interest rates is also a consideration when looking at gold as an investment. In the 70s and 80s interest rates were relatively high, although inflation was also high which meant that real inflation adjusted rates were not so attractive. In the 90s the rate of inflation initially fell more quickly than did interest rates, with the consequence that real rates began to make cash deposits look attractive. At the same time stock markets were booming everywhere so gold, an investment that paid no interest, looked unattractive. Now that interest rates have fallen back and stock markets have crashed, the opportunity cost of holding gold as an investment is low, which has resulted in increased interest in gold as an investment. Concern about national, corporate and personal debt levels has also increased interest in gold as a safe-haven alternative to bank deposits.

Chart 1.22 Gold v Interest Rates



Source: Datastream

Buying gold shares

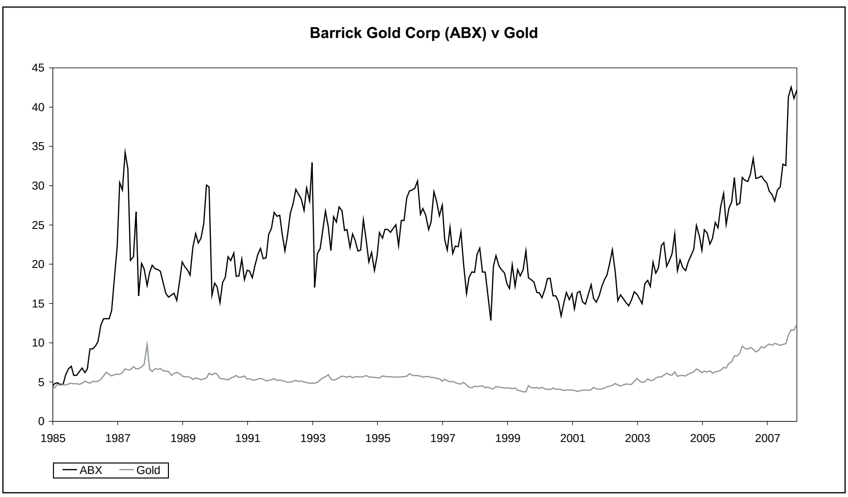
The threat of getting caught by a sudden ban on owning gold can be avoided by choosing gold shares for one's exposure to the metal. In the 30s, US investors, unable to own gold, did extremely well in gold shares, which enabled them to legally benefit from the rise in the government supported gold price. Those who bought the US's leading gold miner Homestake for exposure to the strong gold price, and to hedge against a weak stockmarket, would have outperformed both. There is one slight caveat to this. In 2005 Sean Thornton, Chief Counsel to the US Treasury's Office of Foreign Assets Control, replying to an enquiry from the redoubtable GATA stated that in wartime or a declared emergency the US Government could freeze private citizens ownership of gold mining shares as well as gold. The authority comes from The Trading With The Enemy Act of 1917 and the International Emergency Economic Powers Act of 1977. Whether the US Government would use these powers over gold shares held by private US citizens is a moot point, the message of panic such a move would send would surely be counterproductive. No doubt though there is the odd US citizen who, familiar with the 1977 Act, has already moved his gold shares into offshore nominees, just in case.

The gearing effect of mining shares

One of the great advantages of buying gold shares rather than physical gold is that shares are highly geared to movements in the gold price. By highly geared I mean shares will rise more sharply than the gold price when it moves higher, the opposite being the case, of course, when the gold price falls. This is the result of the effect of marginal gold price gains dropping straight through to the operating profit line. Thus, if a gold mine is used to receiving $300/oz for its output and its costs are $250, it will make an operating profit of $50 per oz produced. If the gold price rises $50 to $350, a 17% increase, then the mine's operating profit rises by 100% to $100 per oz. The effect of a $50 increase in the gold price will, of course, depend on the level of a mine's costs, and many mines have costs well below $250, which would mean that the profit gearing to a rising gold price is less than in our example. For instance, if our virtual gold mine had costs of $150/oz then the effect of a $50 rise in the gold price would be a 33% increase in operating profits, still twice the rate of the gold price rise.

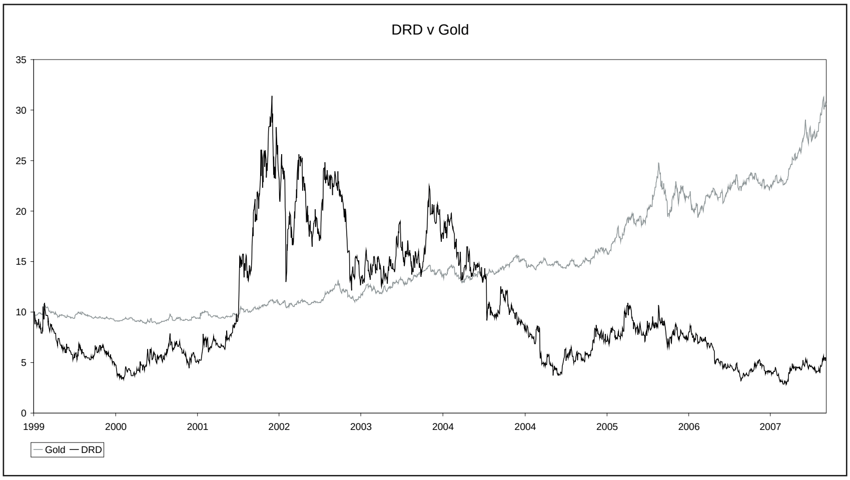
Following are shown two gold shares, Barrick and DRD, plotted against the gold price. Barrick large, expanding and low cost, although still volatile exhibits much lower price volatility than DRD, which historically has been a smallish, high cost producer.

Chart 1.23 Barrick Gold Corp [ABX] v Gold



Source: Datastream

Chart 1.24 DRD [JSE:DRD, Nasdaq:DROOY] v Gold



Source: Datastream

Currency factors

The South African gold mining sector provides us with another potentially volatile influence on operating profits, which is the dollar/rand exchange rate. The level of the US dollar against the currencies of other big producers like Australia and Canada is also influential, but the currency movements tend to be much more modest than those of the South African currency. In the 90s we grew used to seeing the rand depreciate against the dollar, which benefited South African producers whose costs are primarily incurred in local currency. That means that as the rand falls against the dollar a mine's revenue converted into rands will rise even if the dollar price of gold does not change, because gold is sold in dollars. Whilst this is going on, costs which are incurred in rands remain the same. If the gold price rises then mine revenues increase even faster. However, this has never been a one way trend, and despite the rand's chronic weakness in the 90s and in the early 2000s it began to strengthen materially which meant that dollar revenues converted into rands fell sharply. A rising gold price can mitigate the effect but that is not guaranteed. Indeed, recently we have seen SA gold producers struggling to make decent profits despite a weaker dollar and a rising gold price, the reason being rising costs driven by soaring raw material inputs.

The controversial issue of hedging

One of the most controversial areas in evaluating gold shares is the extent to which a gold company hedges. The main purpose of hedging is to protect the mine from a catastrophic loss of revenue when gold goes into a cyclical downturn. On the face of it this seems a most sensible thing to do, even if traditional gold share investors tend to want to carry the gold price risk themselves. In the gold boom of the 70s, forward selling of gold was confined to the activities of the Winnipeg Commodities Exchange where volumes were thin and the participants were largely market speculators. Arguably the first modern hedging deal was the one contracted by Australia's Pancontinental to develop its Paddington gold mine in Western Australia in the mid 80s. Here the company took out a gold loan from one of the bullion banks where it effectively sold forward gold that it would produce when the mine began to operate. The cost of borrowing gold and selling it to raise mine development capital was far cheaper than taking out a commercial bank loan, and when the loan repayments started they could be made in the form of returned gold from Paddington production.

Since then the gold derivative market has exploded. It has drawn in gold miners, often but by no means always high cost producers, seeking to obtain prices well above the spot market level. It has also attracted non-gold miners wishing to exploit the very low borrowing rates on gold to borrow gold and sell it to obtain cash for other investment activities. It is believed that some hedge funds followed this practice, particularly the infamous Long Term Capital Management group. However, in recent years this kind of activity has become less widespread as interest rates on commercial loans have fallen and the gold price has begun to recover.

The gold price rises…and a gold miner nearly goes bust

For gold share investors there is also the complexity of some of the hedge structures put in place by some mines. The 1999 announcement that a group of central banks had agreed to limit their selling of gold had an immediate and positive effect on a languishing gold price, and it soared from the mid

$250s to over $300 in a matter of days. What really shocked the market was that two mines in particular, Ghana's Ashanti and Canada's Cambior, almost went bust because of this. The craziness of a gold miner crashing because the price of gold suddenly surged is unarguable until one realises what was going on. In effect, some mines had sold all their production forward at prices well below $300, and the structure of their derivative book meant that they were committed to meeting margin calls when the book was in aggregate under water, that is to say that the value of the derivative instruments purchased was below the potential value of the gold yet to be produced.

Whilst all this seems to verge on lunacy, it is likely that part of the explanation for what went on was that the derivative departments of the bullion banks did not understand mining and the mining companies' finance departments did not understand derivatives. Having said that, mines today are much less keen on hedging, some have a policy against the practice, and others, whilst historically committed to hedging, are reducing the scope of their activity. Hedging too has, in many cases, reverted to using what are called plain vanilla hedge strategies. In essence, a mine either buy puts or calls which consist of a single payment, betting on the direction of the gold price. Alternatively they could simply sell production for forward delivery with no margin call commitment, thereby locking in an enhanced future price, although one that would not necessarily be above the spot price reigning at the time of delivery.

It is probable that most gold share investors want to retain full exposure to movements in the gold price and not be hedged against a fall in the price. For those gold companies who have management with modern performance-based salary and bonus packages, the volatility of the gold price could play havoc with their rewards. They have in some cases, therefore, collaborated on highly complex derivative structures that aim to preserve a good portion of the upside when gold runs, but also at the same time have in place protections against the possibility of a weakening gold price. Such structures are complex and are not without risk as Ashanti found out. One may also suspect that the way the 1999 crisis was resolved underlines the profitable nature of the gold derivative business to the bullion banks, and the desperate need for them not to see any gold miner go under due to its hedge book. If that had happened the gold derivatives industry would probably have been terminally damaged.

And then there's politics

The other problem that a gold share investor could face is major, politically driven changes to gold mining on a national basis. There have been many examples of this over the years, and in South Africa black empowerment, apartheid reparations and the introduction of royalties on turnover are but the latest example of how governments can spoil the party for investors. In the early 90s the Australian gold mining industry lost its tax-free status having staged a remarkable recovery since the near disappearance of the industry in the 70s. That successful journey back from the dead was too much for the Australian government to leave alone.

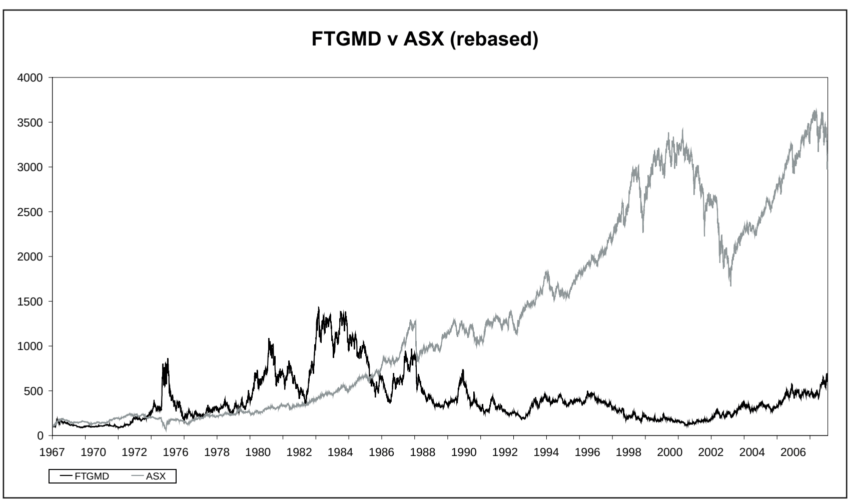
There is also the issue of security of the investor's holding. In the apartheid era the subject of nationalising the South African gold mining industry was discussed by the Nationalist Government on more than one occasion, the industry being primarily under the control and ownership of the mistrusted 'English' South Africans rather than the Afrikaners. The power of the 'English' mining houses, however, won the day, but taxes were always hefty, with the effective rate being as high as 65% for the most profitable mines. Since World War II, mining companies have seen assets in Cuba and Chile expropriated without compensation, and part-nationalisation in Zambia eventually ruin the copper industry. On top of these obvious negatives, which frankly are by no means exclusively a problem for mining companies, gold or otherwise, there are the problems of poor management and in the case of the famous Bre-X scam, problems relating to, at best, inattentive and distant management.

For some, the gold mine sector, despite the huge rewards that some have garnered from investing in it, is just too speculative. If the gold price is going up then the right approach for such investors is to buy the metal direct and perhaps spice up their exposure by buying options, again in the metal. The real gearing in a gold bull market, despite the snags, though lies in the gold share market, and many of those snags can be avoided or mitigated by close observation of what is going on in the sector as a whole.

Gold shares in the stock market cycle

Gold shares have, I believe, an important role in hedging a broad equity portfolio. The claim made by gold share investors is that when industrial equity markets are in retreat gold, and therefore gold shares, are often going in the opposite direction. Certainly this was true during that extraordinary period between 1972 and 1975 when equity markets, on the back of a sustained oil price explosion and subsequent rampant inflation, collapsed, with the UK market, for example, falling 74% over that period.

Chart 1.25 UK Financial Times Gold Index [FTGMD] v FTSE All-Share [ASX]



Source: Datastream

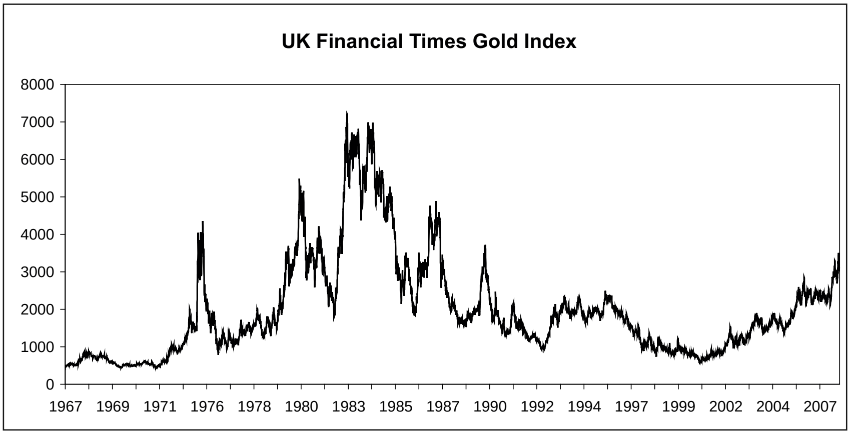
Despite tight UK exchange controls then, which meant that UK investors had to buy investment currency (the so-called dollar premium) to invest overseas and often at a substantial premium to the sterling spot currency rate, London was the acknowledged global centre for mining securities trading.

For UK stockbrokers at this time that was just as well because the collapse of prices and volumes in the UK stock market meant that broker revenues were desperately thin. Fortunately, all the largest brokers and some of the smaller ones had dedicated mining coverage which saved many from financial ruin. It is not clear today, if a similar situation occurred, whether the mining sector, even if it did run counter cyclically, would be able to bail out the securities industry. Certainly the short 2001/02 gold boomlet, which coincided with a sickening fall in industrial equities, suggests not, with many large and small brokers unable to offer even basic gold sector advice. Things have improved in recent years with the now widely acknowledged long-term commodities boom in full swing, and brokers, certainly in the UK, have boosted their mining coverage, but gold specialists remain rare and the number of gold counters has shrunk due to consolidation.

Gold is inversely correlated with the broad equity market…usually

However, the gold share sector is not solely negatively correlated with the broad equity market, because it can also run strongly when the whole market is rising, as happened in the mid 80s. This may sound as if I am trying to claim almost divine status for gold shares, but I am also realistic enough to accept that there are many times when the equity market has risen without gold shares participating in the rise. One could say, though, that there is plenty of support for a view that when ordinary equities plunge gold shares can outperform significantly. Whilst 1973/4 is the most dramatic example of this phenomenon, much more recently we saw the gold share sector racing ahead in 2001/2 as equity markets crashed. Paradoxically, as an added confusion, the market crash of October 1987 brought mining shares, including gold, down as fast as industrial shares.

Chart 1.26 Long term UK Financial Times Gold Index



Source: Datastream

The legendary Julian Baring, Head of James Capel's mining team in the 70s and 80s, who we met at the beginning of the book, saw gold shares in the same terms as an insurance policy on your house. You do not buy buildings insurance because you expect your house to burn down, but rather you take it out against the faint possibility that such a disastrous event might happen, because if it did it would have the potential to wipe you out financially. Gold shares have the potential to provide an investor with counter cyclical growth, a tremendous relative boost to a portfolio when every other sector may be in retreat.

But gold shares have two key advantages conceptually over straight buildings insurance; they can grow in value over time and also provide an income flow through dividends. It is, of course, the case that gold shares can, when the precious metals cycle turns down, also shed value as fast as they gained it as the cycle unfolded on the upside. As has been said before, the need to keep an eye on mining share profits and secure them in due course is not unique to the sector, but the nature of gold shares as a long term wasting asset makes such attention essential.

What do you buy?

Gold shares, as pointed out above, are a classic wasting asset. Mines, and oil fields, once production has depleted them, tend to shut down because the economics no longer work. There may be some mineralised material left, but without further discoveries of substantial additional ore or a sharp rise in the metal price, gold in this case, it may be decided that the capital for expansion could be better spent elsewhere.

There are two broad categories of gold shares these days.

1. There are the **growth orientated** groups like Canada's Barrick Gold who seek primarily to use shareholder earnings to expand the business either through new mines or through increasing output from existing operations.
2. In contrast, there are those groups like South Africa's AngloGold Ashanti which, interested though it is in expanding the group, is also aware that **dividends** are important as a tangible reward to shareholders for the group's success.

Feeding into these broad categories are the smaller, often single mine companies, common in the past but rather superseded by today's philosophy of diversification, and the gold exploration companies. These latter companies are, of course, seeking to become the producers of tomorrow, and hope is a major driver of their market performance. Having usually no production of their own they are reliant on speculative shareholder capital to fund their search for gold, although some of the highly regarded explorers can often get their expenses paid by large producers in joint venture arrangements.

The role of mining houses in South Africa

In the past, when the South African gold mining industry dominated western production, the emphasis for shareholder returns was the dividend. The industry worked through half a dozen or so mining finance houses like Anglo American, who in turn ran a number of individual gold mines which they had initially financed and then floated on the stock exchange. There were, little more than ten years ago, around forty individually quoted South African gold shares – some had substantial ore bases and reasonable gold grade which put them in the long life/low cost category, while others were rather the reverse with a low gold grade and a short life/high cost profile. The idea was that if the gold price went up, as it did in the mid 70s, more ore would come in to play and alter for the better the profile of marginally profitable mines in particular. The issue of new mines was the responsibility of the mining houses who had an extensive exploration programme aimed at finding new gold resources. The South African tax system drove the industry's structure as the mining houses were able to charge exploration as a pre-tax expenditure. Individual gold mines had a unique margin-related tax and lease charge system, which meant that only exploration done on the gold mine's individual lease was allowable. For years, outside exploration spending had to be carried out by the controlling mining houses themselves not by group gold mines. In this way the houses also had a steady stream of new gold mines to bring to market.

Size matters

In recent years the gold mining industry worldwide has changed structurally. Emphasis is now placed on gold companies building up production to what has become the magic 1 million oz per year mark. Membership of various gold share indices around the world is now driven by annual production levels, and institutional investors still interested in gold will often only look at large producers and 300,000ozs is often the cut-off. Some of the larger producers, known as the Global Tier 1 group, are listed in the following table. These large producers tend to sell at a premium to their smaller peers because of this institutional support. However, these large producers do not have the same gearing to the gold price, or to new discoveries, or gold price related increases in production.

Table 1.20 Tier 1 Gold shares (trailing 2007 production)

Largest producers	Production (ozs)	Costs per oz (US$)
Barrick	8,060,000	393
AngloGold Ashanti	5,477,000	476
Newmont	5,300,000	396
Gold Fields	4,024,000	513
Harmony	2,334,000	609
Freeport MacMoran	2,329,000	252
Goldcorp	2,292,000	250
Zijin	1,584,000	-
Newcrest	1,617,251	417
Kinross	1,588,000	455
Polyus	1,214,000	348
Polyus	1,214,000	348
Buenaventura	1,086,000	309
Lihir	671,000	462

Source: Company statements, annual and quarterly reports

In a gold bull market it will still pay the more aggressive investor to look for gold miners which have higher costs than average as their earnings will rise faster than those of low cost producers in percentage terms as the metal price rises. The safest stocks will remain the large diversified gold groups like Newmont, AngloGold, Barrick and Gold Fields, and it is this type of gold stock that falls into the defensive insurance category. In saying this I am differentiating between:

1. Buying gold shares for exposure to maximum growth in a gold bull market, and
2. Having a defensive strategy to hold a core of quality gold shares which act as a counterweight when equity markets are weak but also do well when gold rises.

For those investors who really do have nerves of steel and seek maximum performance, the gold share exploration sector, with luck and skilful stock picking, may well provide the greatest returns, particularly in a bull market. The reason for this is straightforward. Successful exploration companies provide two pricing influences – the potential of the newly discovered mine and the prospects for gold itself. Producers, both large and small, are usually just a play on the gold price, although they, themselves, may well discover new sources of gold as a result of their own exploration efforts. However, it goes without saying that great care is needed as exploration prospects will need to be expertly assessed and many investors may not be confident of their ability to steer their way through exploration reports. It is worth remembering that even experts have been duped by misleading publication of exploration results. Amongst the things that need to be analysed are the configuration, size and grade of the deposit, its geographical location, the geological setting and, of course, the likelihood or otherwise of it being developed given the macro and micro-economic circumstances at the time. We go into these key aspects later in the book.

Gold mine classifications

As a loose guide for newcomers to the gold mine sector the table overleaf shows the broad categories that gold mines come under.

1. We have the **major diversified gold companies** which have a number of usually large operations and these are very often widely spread geographically.
2. The next category is the **large gold miner** with one substantial mine or one core operation which overshadows its other interests.
3. The **smaller category** mines may also have one core operation or a number of small operations, and they may be declining forces due to falling production from ageing mines or growing forces with small but expanding operations.
4. In the **exploration and development** category are those companies, who may be small producers but whose real future depends either upon a

promising exploration programme or the successful development of a gold deposit.

Table 1.21 Classification of gold mining companies

Classification	Example companies
Large diversified	Newmont, Barrick, AngloGold Ashanti
Large undiversified	Newcrest, Buenaventura, Zijin
Smaller	Randgold Resources, Peter Hambro Mining
Exploration/Development	Aurelian Resources, St Andrews, Leyshon

We have shown a few examples of each category but these cannot be taken as recommendations in any way. Indeed, in the two junior categories literally scores of different companies could have been used as illustrations; our choices were metaphorically drawn from a hat.

As far as how each category differs from the others when the decision to invest is taken, the issues involved are sometimes complicated. Fairly clear is that if you are intending to create a small core of gold mines in a diversified equity portfolio for risk hedging purposes then the **large diversified gold companies** are the obvious choice. At the other end of the scale if you are looking at the gold sector with aggressive intent, i.e. you think the gold price is going to rise sharply, then the smaller stocks tend to perform better.

This latter point, however, is not clear-cut as larger producers, particularly if their costs are on the high side, may have gearing to the gold price and rise strongly. Certainly when the gold price began to recover in 2001, the large South Africans like Harmony and Gold Fields (not shown above) led the gold sector recovery.

The big **single mine dominated producers** like Buenaventura are probably not going to perform much out of line with the big diversifieds. The **smaller producers** may offer some outperformance possibilities, especially if they have large potential resources just requiring a higher gold price before they can be brought to account. As far as the **gold exploration sector** is concerned, a strong gold bull market will increase investors' appetite for risk, and if exploration success can be correctly anticipated the upside in the share price of the lucky company could be enormous. A recent example of this has been Aurelian with its spectacular Fruta del Norte gold discovery in Ecuador. This latter point, of course, applies to any mining share not just those in the gold sector.

When do you buy?

Timing is probably the most critical element in successful gold sector investing. A gold boom is an awesome event to behold and as I have stressed previously it often occurs when more conventional investment sectors have begun to disappoint. The cyclicality of the sector makes it vitally important that gold share investments are not made around the top of the market, unless the investor knows what is going on and is merely seeking a short-term trade, something a few people (very few) did profitably towards the end of the internet bubble in 2000. The inevitability of ultimate decline in the gold share market will almost certainly lead to shares which have been bought at the top and held, being booted out in deep frustration at the bottom of the market.

Since gold experts in the market remain limited in number, and certainly in quality, both in broking and fund management, investors will often have to rely on their own advice for timing. Certainly broad consensus that gold has had its day can be a good indicator that sentiment is about to change for the better. Because a rising gold price often signifies a deteriorating financial/economic background there also is a natural aversion amongst many brokers to gold shares as an investment class and recommending them to their clients. The reason for this is that brokers make their living from trading the broad market, not just a small defensive part of that market, and therefore are reluctant to admit that market prospects are poor enough to push them towards the gold share sector. A glance at the relentless bullishness on the broad market of many general research newsletters aimed at private investors written by UK brokers would illustrate the point. When gold shares have fallen a long way and your broker still advises avoidance, a look at the charts, to check on whether the fall has flattened out and the trend therefore may be spent, is essential. If the gold price itself has also been consolidating for an extended period and the pace of the downward fall has clearly been exhausted, a long term buying opportunity may be beckoning.

Dividend yields can be a clue

In the past, dividend yields on South African gold shares were an almost foolproof signal of market tops and bottoms. When gold shares historically have yielded in the 12% to 15% range, as they did in 1977, 1983, 1985, 1989 and 1993, they have been a buy, and when they have moved to a single figure yield basis, around 4%, this has signalled a sell. These days, following the major consolidation of the South African gold share sector, there are only a handful of stocks to choose from and full distributions have become a thing of the past. However, some timing guidance is still possible from gold share ratings; obviously a higher than average yield and lower PE, if based on sustainable performance, would be well worth consideration, admittedly something that could well apply to other market sectors.

Currencies – as always, watch the US dollar

Currency movements may also provide some clues to gold timing, although short-term changes in the broad trend of the US dollar may send out false signals. In the past a fall in the US dollar has often been accompanied by weakness in the other gold mining country currencies – the Canadian and Aussie dollars and the rand. The strengthening currencies a decade ago used to be the German mark, the yen and the Swiss franc. In such circumstances the weak US dollar stimulated the gold price and gold mine revenues started to rise; since the local currencies of other gold producing nations were also deteriorating in line with the US dollar the increased revenues fell straight to the bottom line. More recently we have seen the US dollar, after a long bull market, beginning to weaken against the mining country currencies as well as the euro, the yen and the Swiss franc. Because of this, some gold shares in 2003, particularly the South Africans, lagged far behind the rise in the gold price. Having said that, we may be witnessing an aberration in the currency market, and in due course the old 'English speaking' currencies may move back into line with the US dollar. At that stage the strength or otherwise of the US dollar may once more become a lead indicator for gold shares. For the moment a very broad consensus exists that the US dollar will be weak for some years and some 'anglo' currencies such as the Canadian dollar will continue to strengthen against its close neighbour.

The equivocal influence of interest rates

Although some commentators view interest rates as a possible timing indicator, I would warn against using them for this purpose without very close thought. The problem is that essentially gold does not yield an income return, so reward comes entirely from increases in its value. So when interest rates are low and falling, the opportunity cost of switching from bank deposits to gold is low, i.e. if you invest in gold you give up only a modest income for switching from your bank deposit account. On the other hand if interest rates are high and rising, the opportunity cost of choosing gold rather than putting your money on deposit may be high. The complication comes when you have interest rates rising in an environment of high inflation, in which case the opportunity cost of holding gold appears high. However, since gold is a hedge against inflation this may not actually matter. Also, if inflation is factored into the interest rate equation the real inflation-adjusted return may not be very high, and may even be negative thereby reducing the real opportunity cost.

Over the long term, spotting sustained increases in money supply can be helpful in ascertaining whether and when gold will start to take notice of the inflationary implications of such continuing monetary stimulus. The short term problem is that if in the broad economy the supply of goods and services is rising at a time of weak demand there is unlikely to be any great increase in price levels as producers of consumer goods will have little or no pricing power. In due course, if monetary stimulus continues, this balance is bound to shift as the combined weight of money created finally begins positively to affect demand for goods and their prices. At this stage, inflationary influences are likely to begin to make themselves felt but, as we have seen over the last few years, both Japan and the US have been throwing money at their economies without stimulating inflation. This indicates the possibility of long leads and lags in the time it takes inflation to surface in the broad economy, and some economists believe that, certainly in the US, they can see the first signs of higher underlying inflation.

Pitfalls and pointers in gold

Many of the principles that underlay investing in mining are common to all sectors – costs of production and finance, grade of ore mined, local/national rules on royalties, taxation and on upstream processing, satisfactory local infrastructure and labour availability, ease of access to markets, and scope to operate flexibly to benefit from good times and survive in bad times. In gold mining there are some helpful pointers to ease the task of stock selection.

Ore grade

The grade of ore in gold mining has been on a sinking trend for many years. In the late 60s when most investors were playing in the Australian nickel mining boom, the gold price was into its third decade of being anchored at $35 and some mines in South Africa still mined grades of 1oz (32gms) of gold to each tonne of ore. In 1971 the gold price was effectively freed and as it soared ore grade fell sharply as mines found that less gold per tonne of ore mined was needed to generate economic revenues.

Today, gold mine grades tend at best to be in single figures in grams per tonne; a large open surface mine might be mining and processing ore of a grade no higher than 3 grams per tonne, and often much lower. Grade in underground mines varies but in South Africa with development costs sunk many years, ago a grade of 3 to 4 grams could be economic depending on the gold price. A new mine in such an underground environment would probably have to grade above 10 grams per tonne.

So investors trying to gauge the likely prospectivity of a new gold discovery would have to base their view at least partly on the deposit's grade. When looking at an exploration situation additional care is needed as very high grades may be reported, but they may not be typical of the whole deposit under investigation. Such grades are described as *bonanza gold*, and when a reserve/resource figure is being compiled these bonanza grades are often arbitrarily ignored to give a more realistic overall grade. The high grade ore does not, however, disappear and when the deposit is finally producing gold, the mined grade, as a result of the bonanza gold, may be higher than the stated reserve figure.

Production costs

Gold mines tend to show their costs as a US dollar per oz figure, although some Australian producers rather confusingly use Aussie dollars. The most quoted figure is the operating or production cost figure, often described as the total costs figure, which does not contain central corporate costs, finance costs or depreciation. Production costs show what it costs to keep the mine going at the most basic level, but it is clearly important to account for the other costs as well. Some mines become only marginally profitable in operating terms at times of low gold prices, and disguising central and financial costs which come on top could mislead the unsuspecting investor.

Mines have some flexibility as far as costs go, and the weakness in the gold price since the mid 90s has meant that they have had to exploit this to the full. The strength of the US$ over part of the period was helpful, as mines in countries like South Africa had costs denominated in the weak local currency which meant that costs converted into US$ fell even though the gold price had also fallen. This helped the mines maintain their profit margins. Over the last few years they have had to plan their operations on the back of a gold price which has tended to trade above $600 with $550 as a bottom level. In 2001 gold was close to $350 and in 2003 broke through

$400 for the first time in ten years. This move certainly relieved the pressure on a number of high cost producers whose operating margins soared as a consequence. The South African producers unfortunately had to contend, for a couple of years, with a strengthening rand/US$ rate which has in part cancelled out the advantage of a higher gold price. Recently this situation has eased a bit as the rand has weakened again. Against this volatile background, mines have had to get on top of their production costs and use the low end of the established gold price trading range as the target below which these costs have to be forced. At the moment this looks like $500, with industry average costs heading towards this figure. At the same time some producers have become very aggressive in the area of derivatives where they have sought to mitigate part of the cost burden by achieving a gold price above the market spot price through a variety of structures planned for them by the banking industry.

Infrastructure at location

One of gold's particular characteristics, as mentioned before, is that it has a very high value for a very low weight. The significance of this is that it is relatively easy to get the gold to market; a helicopter could be used to ship gold from a very remote mine location on a regular basis. A weekly trip, for example, might see a tonne of gold (32,000ozs) being transported, or 1.6 million ozs annually, which would constitute a very big mine.

For a base metal such as copper a complex transport infrastructure would be required, like the Tanzam railway which takes copper halfway across Africa from the Zambian copperbelt to the port of Dar Es Salaam. Of course the establishment of a mine in a remote location is always a difficult matter as plant, equipment, fuel and other mine supplies have to be brought in, although for some of the bigger items such as plant this is a one-off happening.

Consequently a gold discovery in a remote location is unlikely to be a problem and as long as there is water on or close to the property, which is very often the case even in a very dry environment, the only other issue is the proximity of power. Surprisingly often, power lines are found within a reasonable distance of even quite remote locations.

Geographic location

The importance of where a deposit or mine might be found is not limited to just gold mines but it is nonetheless critical in evaluating a gold prospect. In some countries like Zimbabwe it is relatively easy to explore for and develop a mine, even in these difficult times, but great complications arise over how the metals won will be marketed and at what price. The problem is that the price that a mine can sell its gold for is controlled by the government. This happens also in China, where permission to develop a mine is not always straightforward. In Greece, although there is a format for obtaining mining permission, of two major gold mines planned in the 90s one has had to be abandoned for environmental reasons and the other one, the Sappes project now owned by Australia's Mineral Securities, and backed by the Greek Government, continues to struggle to secure local support. In Argentina, Canada's Meridian Gold, having acquired the promising Esquel gold project, which was backed by state and central government, has encountered very strong local opposition over the twin issues of potential water pollution and spoiling an area of natural beauty. There are, however, countries where the establishment of a gold mine still continues to command all round support for the jobs and wealth it creates, Mali in West Africa and Tanzania in East Africa are two such countries.

New mines

One of the main problems that an ageing industry like the gold mining industry faces is finding new sources of gold. Both South Africa and Canada have seen output levels fall sharply over the last few years and there is little prospect of them seeing a major pick-up in the immediate future, if at all. Russia and China are better positioned to increase production over the medium term but any sudden and substantial across-the-board increase, as we saw in the 80s, is unlikely. The number of significant new gold discoveries has fallen over the last few years, in part as a result of the flat gold price that has only started to show some life since 2002. It is important to note, however, that whilst industry output struggles to maintain even stability, demand rises, underpinning the strong price trend of recent years.

Whilst output stagnates there have been at least two gold discoveries recently that suggest there are still opportunities out there to find major new gold deposits – namely Fruta del Norte in Ecuador (Aurelian Resources) and Tropicana in Western Australia (AngloGold Ashanti and Independence Group). Discoveries of this quality are hard to find and take time, and gold exploration spending has only begun to increase again since hitting a low of $800 million in 2002, having been as high as $3.6 billion five years before. It is a moot point as to whether accelerated exploration spending will lead to a string of major gold finds. If it did, it would certainly fire market interest in gold shares which has been rather lacking since 2003, investors having been more taken with the surging earnings of the base metal and industrial minerals earnings increases being reported by the giant mining houses who have also provided market excitement in terms of takeover activity.

It is certainly the case that in past gold booms there has been quite a lag between the rise in the gold price, and therefore the rise in gold mine profits, and new discoveries as a result of the inevitable increase in exploration spending. The huge increase in output achieved in the 80s following an extended gold boom in the 70s is unlikely to be repeated this time round, and this could support further increases in the gold price going towards and into the second decade of the century. We can expect also that there will be more exploration successes in the future but they will inevitably be increasingly difficult to identify.

Table 1.22 Gold statistics (2007)

	Mine production (tonnes metal)	Mine reserves (tonnes metal)
Australia	280	5,000
Canada	100	1,300
China	250	1,200
Indonesia	120	1,800
Peru	170	3,500
Russia	160	3,000
South Africa	270	6,000
United States	240	2,700
Others	920	17,000
Total	2,510	41,500

Source: US Geological Survey

Concluding on gold

Gold generates more emotion than the rest of the metal sector put together. It has its supporters and its detractors, not all of whom are rational. Despite that, gold shares rate, in my view, a position in every portfolio. However, they seldom attract much attention, beyond a professional core of followers, until crisis hits the financial system sending conventional investments like ordinary equities crashing and investors panicking into last resort assets, of which gold is perhaps the best known.

Gold's detractors like to point out that all the gold that has ever been mined is still with us, ironically underlining its durability, beauty and value, and so, they argue, the above ground inventory is always growing. Most other metals are literally consumed and in many cases, recycling accepted, can disappear for ever due to disposal or corrosion. But gold's supporters know that much above ground gold will never be available to the market as it is locked up in priceless art objects, churches, ancient plate and in old and antique jewellery with either sentimental value or value far in excess of its metal worth.

Some detractors also mention, in relation to central bank gold holdings, that silver was once a reserve asset, and the central banks ended its reserve status and sold off all their holdings. Gold, they argue, will go the same way, and indeed the metal is no longer money, and central bank sales from reserves continually undermine its reduced role as a reserve asset. Whilst some will find this disturbing, the truth is that gold is special, unlike silver it does not corrode over time, and if central banks do not want it then there are plenty of people in the world who do not trust their governments or their currencies and who are very happy to assume ownership.

The gold story is not always straightforward, and dichotomies such as the bullish effect on gold historically of both inflation and deflation can confuse. Some understanding, though, of how gold interacts with more mainstream assets is worth having as correctly applied it can help to lift relative performance and boost personal wealth.

The environment and politics

Whilst investors looking at the mining sector will be keeping their eyes on a whole range of macro and micro economic factors as they ponder their decisions, they need also to be aware of rather more extraneous influences. Foremost in today's market are the issues of the environment and politics. Of course these factors have always had the power to influence investment in mining, but in the dog days of the 90s they were often subsumed at national government level in order to attract foreign investment to what was an ailing sector.

In more recent years the environment has assumed growing importance in the thinking of mining executives and is something that investors ignore at their peril. As I have mentioned earlier there are some countries that are more relaxed than others when it comes to the environment and related issues such as pollution and health and safety. But going forward it would be wise for all investors to assume that the environment will increasingly have an impact on even the most backward countries.

Also included with the environment, particularly where a mine is being established in the outback, is the responsibility to provide services for the locals and the families of the mining personnel living on the mine. Those investors who have access to the annual reports of the companies they invest in will be familiar with the mission statements contained in them and the increasing amount of space given over to outlining the company's environmental/social responsibilities. These would not have been issues covered in annual reports twenty years ago.

Satisfying both government and local populations

For shareholders looking to benefit from the rewards that come from a brand new, high quality mine, the best protection they can have in today's world is a development plan that, without wasting money, takes full account of both the demands of government and the needs of the local population. In the past some mines were developed with only basic services, and these had to relate directly to the needs of the mine. So there might be a road built for the mine which the locals found useful themselves, but the mining company would have been reluctant to build an amenity, such as a community hall, if it was not of use to the mine. That type of approach is history now. So an investor will know that the mining company will be committed to spending considerable sums on improving the environment of those who live near the mine in order to obtain permission and cooperation in building the new mine. Also factored into the development equation is the reclamation of the site when mining ends. No longer can a mine be closed leaving its facilities – shafts, buildings, etc. – to rot away naturally; the whole thing has to be closed in an ordered and safe manner.

The further into the boondocks the mine is located the less onerous are likely to be both development and closure regulations, but some social facilities will be required and the mine will not be allowed to cut corners and pollute just because it is miles from anywhere. Also such projects, with the possibility of lighter regulation, may well not gain too much from that due to the additional operating costs associated with the more remote location.

Treatment of waste

One of the biggest environmental issues as far as mines are concerned these days is the disposal of waste and we have in recent years seen major problems in this area in Indonesia and Papua New Guinea to mention just two countries where foreign mining companies have run into trouble. The strength and stability of the waste dumps that both underground and open pit mines generate has always been a concern, and the fact that they are unsightly is also an issue especially in areas of natural beauty.

Some years ago a few exploration companies were looking for gold in the west country of England in an area of natural beauty which also supported small local communities jealous of the rural peace in which they lived, and which also was an area with valuable farmland. The exploration programmes are no longer and will probably never be revived so unlikely is permission for a mine to be granted. The prospect of unsightly waste dumps on its own would be enough to kill any hope of building a mine, although cynics would point out that rural England is a prime target for the siting of huge government supported wind farms and local opposition is being ignored.

Safety concerns

Unfortunately the environment and mining development is not yet a level playing field. The example of China, a country with a stock market that is increasingly attracting the attention of foreign investors, is one that immediately springs to mind. One aspect of mining and the environment is the safety of working conditions in mines. In 2006 around 4,800 miners were killed in Chinese mines according to government figures, and that figure doesn't include miners working in illegal, unlicensed mines where deaths are not reported. The largest part of this figure relates to coal mines, where apart from the natural dangers of rock conditions when working underground, there is also the fact that over a third of China's coal mines are high methane operations liable to frequent explosions. The incidence of the miner's chest condition, pneumoconiosis, is also widespread in China. Foreign miners in China like Griffin Mining and listed Chinese companies like Zijin Mining have to operate to much higher environmental standards, underlining that such standards are not unknown in China, even if they are not widely adhered to.

Good corporate governance is also an issue in China. The government would like to see more of it but smaller Chinese mining companies, many of which are now being privatised, are not interested in best practice or indeed any practice in this area.

Environmental costs

In the strong commodity markets of the mid 2000s, with prices for many metals at record levels, environmental costs are readily absorbed and if a new mine incorporates best practice in its development plans, rather than shoehorn them into an already operating mine, the cost may well not be too burdensome. What investors need to find out then is the actual running costs of a mine's environmental side. By that I mean those costs that are not directed towards production, and therefore revenue, but are unavoidable within the mine's legal obligations. The reason for this is that such costs cannot be reduced in hard times when metal prices weaken, thus they may precipitate losses earlier than if the obligations had not existed.

ATH Resources, a UK coal mining company, illustrates the potential burdens of environmental legislation. Operating a number of opencast coal mines in the UK it has major responsibilities in terms of clearing up after it has mined out reserves, and the UK is a country with very tight environmental legislation. The cost of this is of course factored into its development plan and its return on capital calculations, and fortunately over the last few years the coal price has remained firm, as has demand. But in the event of a sharp deterioration in the market ATH might be faced with closing down some of its operations, and with that begin to incur remediation costs just as profits came under pressure. In the UK there would be no chance of walking away from these obligations. It is, of course, a risk run by many other mines, particularly in the advanced world, and ATH has rather cleverly acquired a specialist remediation and reclamation business recently, a business that is likely to be busy when mines are closed down.

Local opposition to mining activity

Up to now we have looked at the broad principle of the environment and its effect on mining companies and their operations and development plans. But investors need to be aware that these days there is an increasing risk that opposition to the development of a mine at the local level may scupper the project. Whilst some opposition to mining activity can start at the stage of acquiring a lease/claim, often long before any exploration work begins, it is more likely that trouble will start when an exploration project turns into a mine development project.

Latin America has suffered particularly in this area. One example was the Esquel gold deposit in Argentina which was discovered by small UK miner Brancote. The potential of Esquel attracted the attention of Canadian gold miner Meridian who successfully took over Brancote, which was probably too small to develop Esquel into a mine on its own. Unfortunately for Meridian none of their development plans, although agreed with the authorities in Buenos Aires, passed muster with local interests, and the longer Meridian pressed the more determined became the opposition to developing a mine at Esquel. The deadlock continues to this day, and this is not an isolated situation either.

So is there any way that wary investors can anticipate problems in the environmental area?

It is certainly the case that a number of countries in Latin America have become quite difficult with regard to new mine development, Argentina is one and Bolivia is another. Tiny and poor El Salvador has two Canadian owned projects stalled awaiting government environmental clearance, and also in one case facing local opposition to pre-exploration field work. Despite its poverty El Salvador has discouraged mining activity since the revolutionary 60s and clearly the current government is finding it difficult to slip the bonds of the past. Honduras is also anti-mining and a new law introduced in 2007 looks set to make it almost impossible to mine in the Central American country.

Investors must, therefore, pay attention to how welcoming governments are to overseas mining interests. Although not always straightforward, Africa is not a bad place to undertake exploration, and foreign mining groups have taken advantage of the more encouraging climate there since the fall of the Soviet Union.

Potential investors should also pay attention to the record of the countries that those companies in which they are interested are operating. If rules are laid down and are reasonable and are adhered to without persistent alteration, and importantly mining operations have been developed and are running smoothly, then investors can feel some confidence that money spent in such an environment will not be wasted. One African country whose record over the past ten years or so inspires confidence is Mali, where a number of gold mines have been developed. Success begets success and Mali has become a very popular destination for gold explorers.

Government attitudes towards mining change over time

At this stage we are beginning to drift towards that other headache for mining share investors: politics. Indeed it could be argued that the environment is a political issue, but not the only political issue that mining companies, and therefore investors, have to consider. As I mentioned above, the fall of the Soviet Union at the start of the 90s saw a massive withdrawal of economic and financial support from client countries around the world. Many of these countries, particularly in Africa, had not welcomed any new foreign mining companies since the end of the colonial period in the 60s, although the odd South African major, Anglo American was one example, did manage to keep a foothold in countries like Zambia. With the withdrawal of Soviet support in the early 90s, the former client countries turned to the World Bank and the IMF for help in restructuring their economies and the doors began to open to foreign capital.

Although this process was somewhat jerky at the start – some countries like Zambia embraced the new era enthusiastically, others like Zaire/Congo/DRC were less easy to deal with – over time it has thrown up a number of highly profitable investment opportunities, especially as a result of the early 2000s metals boom. However, investors need to remain on their guard because government attitudes towards mining definitely change over time. One example for the better, as we have seen earlier, has been a change of heart in Australia towards uranium mine development as the earlier concern about nuclear pollution has been overtaken by the fear of global warming. Unfortunately there are plenty of examples of the reverse with government attitudes hardening, as has happened in Venezuela.

Working with governments

Investors should always follow their investments closely, particularly those they hold in the mining sector, because things can move very quickly and unfortunately political change can spoil the party. Mining companies over time have often chosen to give third world governments a stake in the new mines they are developing and to make the financial terms as friendly as possible – usually the government gets a free stake of around 20% and the company arranges the financing and is reimbursed for the government's stake in the early years of operation by taking 100% of the cash flow until the government's free carry has been covered. In an era of low interest rates this works well, but it may be more painful for the operating company when interest rates are high. As an inducement for companies to come and invest, governments will offer tax holidays and low tax rates when taxes are paid, relief from import taxes, accelerated write-offs and no restrictions on remittances of income overseas. These inducements of course can often have a material effect on project returns. Governments may also offer attractive reliefs to invest in infrastructure improvements that may be helpful to the mine project, but are almost certainly very helpful to the government's standing with the voters. It therefore follows that investors need to keep an eye out for changes in a government's attitude; having encouraged companies and their investors to find and then build a mine it is historically not uncommon for a government to change the rules.

It is also the case that very large new private sector projects in countries that had previously been under Soviet hegemony can create problems as governments, knowing that the private mining company offers no political or military threat, can bang the national interest drum without fear that tanks will roll into the capital. In recent years the Oyu Tolgoi gold/copper project in Mongolia, where Canada's Ivanhoe Mines, whose Chairman is the colourful Robert Friedland, had established a potentially large mining development on a prospect first discovered by BHP, became the subject of a long running argument between Ivanhoe and Toronto's Globe and Mail newspaper over a wide range of issues, both political and financial, relating to the project. The shares having peaked at around C$12 in late 2003 rapidly halved as negative stories circulated about the project. They only broke back through that previous high in early 2007, as hopes of a development agreement with the Mongolian Government rose, although more recently further serious doubts have arisen as to final development permissions. Ivanhoe also introduced Rio Tinto into the project to underpin its development credentials. Rio Tinto will provide a major part of the project finance and can end up with a 40% stake in Ivanhoe itself. Ivanhoe's roller coaster ride underlines that even companies with first class projects can suffer when market confidence is undermined.

One of the issues that often arises from a metals boom is the sharp rise in profits which, though usually sparking a sharp increase in royalties and tax paid to the government, frequently is the subject of national envy and greed. This can lead to governments changing the rules in order to obtain a bigger slice of the growing revenue pie, so companies often have to accept a revised and less-than-ideal project structure, to the detriment of shareholders.

Climate change

Another fast developing political issue facing mining companies is the ubiquitous climate change story. Of course the natural resources industry is not the only industry with a carbon footprint, but it does have a high profile in this area because its use of precious and irreplaceable metals and minerals is seen as environmentally damaging by some, so the industry becomes a polluter two times over. This issue is unlikely to affect explorers and small mining companies too much, but it is one that the big mining giants do take trouble over as they work on improving their public image. Dealing with climate change issues can also lead to long-term savings for some of the bigger operations where fuel economies in particular can provide more than useful financial returns to big mines, so companies can achieve a double benefit from acting in this area. Many of these socio-political issues are closely followed on a global basis on the Mines and Communities website (www.minesandcommunities.com).

2. Mining Markets

Having taken the decision to participate in the mining sector the investor has a number of decisions to make, the first relating to the market in which he wants to invest. What is meant by that is the desirability of one market over another in terms of investment products available and the statutory standing of the market in its country context. Fortunately, the main mining share markets are all satisfactory from this point of view which enables the investor to concentrate on issues such as service, costs and convenience. The standing of markets such as London has led in recent years to the phenomenon of foreign companies changing their country of incorporation in order to list their shares publicly for the first time (I make further mention of this development below).

Some investors may be nervous of investing in overseas markets because of the perceived currency risk and prefer to confine their mining investments to UK stocks. In fact, as has been said before, there is always a currency risk in any UK mining stock where, as is common, the operations are overseas. This, of course, applies to any UK company with sizeable overseas business (most of the Footsie for instance). Indeed, it could be argued that currency rate changes are often very gradual and the effect on earnings is often mitigated by other influences such as rising revenues. Also, where the investor is taking an aggressive stance on the mining sector and buying a small speculative share, this action in itself implies far more risk than longer term changes in currency rates. Having said that not all foreign markets, even within the mining-experienced English speaking ones that primarily concern us here, are exactly the same and this should be borne in mind when trading.

London

As things currently stand many of the world's largest mining groups are now incorporated and listed in the UK and are FTSE100 stocks. There are also a number of medium sized UK incorporated miners and a rather larger, and growing, number of small UK incorporated mining companies. As well as these there are mining companies which are, to all intents and purposes, UK companies but which are incorporated in a UK offshore environment like the Channel Islands. UK (and UK offshore) incorporated mining companies with a full listing appear in the following table.

Table 2.1 UK mining companies with a full listing on the LSE

Company	Code
Anglesey Mining	AYM
Anglo American	AAL
Anglo Pacific	APF
Antofagasta	ANTO
BHP Billiton	BLT
Bisichi Mining	BISI
Eurasian Natural Resources	ENRC
Ferrexpo	FXPO
Fresnillo	FRES
Gem Diamonds	GEMD
Hochschild Mining	HOC
KazakhGold Group	KZG
Kazakhmys	KAZ
Lonmin	LMI
Randgold Resources	RRS
Rio Tinto	RIO
UK Coal	UKC
Vedanta	VED
Xstrata	XTA

Note: The above companies are deemed by the FTSE Nationality Committee to be incorporated in a UK jurisdiction (UK or Channel Islands); companies with their main listing in the UK but incorporated outside the UK (Aquarius Platinum) are not included.

The UK mining sector is officially represented as one of the FT Actuaries Industry Sectors which are published in the *Financial Times* each day; the mining sector contains 19 stocks. The FTSE series also includes a separate Gold Mines Index containing 17 companies (see following table), all but one foreign, and that index sub-divides into separate indices for Europe/Middle East/Africa, Asia Pacific and the Americas.

Table 2.2 FTSE Gold Mines Index (August 2007)

Company	Country of incorporation
AngloGold Ashanti	South Africa
Barrick	Canada
Buenaventura	Peru
Cambior	Canada
Centerra	Canada
Durban Deep	South Africa
Gold Fields	South Africa
Goldcorp	Canada
Harmony	South Africa
IAMGold	Canada
Kinross	Canada
Lihir	Papua New Guinea
Meridian Gold	Canada
Newcrest	Australia
Newmont	USA
Resolute	Australia
Zijin	China

Note: Since August 2007, Meridian has been acquired by Canadian gold group Yamana.

There are also a number of foreign mining companies with listings in the UK. Some of these are very historic as in the case of the South African gold mines which are also very much secondary ones now, and there may be other listings elsewhere.

Growth of mining stocks on AIM

In recent years we have seen a new kind of London listing on AIM where primarily Australian mining companies seek a secondary listing to raise capital from UK investors but retain their Australian incorporation. Listed in the following table are the current mining stocks with an AIM listing; it should be remembered, however, that the list continues to expand rapidly. A number of mining companies are also listed on PLUS, the old OFEX.

Table 2.3 Basic Resources companies (mining and metals exc. Oil) listed on AIM (Sept 2007)

Company	Code	Company	Code
Acertec	ACER	Kopane Diamond Developments	KDD
African Consolidated Resources	AFCR	Kryso Resources	KYS
African Copper	ACU	Landore Resources	LND
African Diamonds	AFD	Lapp Plats	LPP
African Eagle Resources	AFE	Latitude Resources	LTR
African Minerals	AMI	Leyshon Resources	LRL
Alba Mineral Resources	ALBA	Lithic Metals and Energy	LMY
Albidon	ALD	Maghreb Minerals	MMS
Alexander Mining	AXM	Mano River Resources	MANA
Allied Gold	AGLD	Marakand Minerals	MKD
Altona Resources	ANR	Mariana Resources	MARL
Amur Minerals Corporation	AMC	Medoro Resources	MRL
Anglo Asian Mining	AAZ	Medusa Mining	MML
Angus & Ross	AGU	Mercator Gold	MCR
Archipelago Resources	AR.	Metals Exploration	MTL
Arian Silver Corporation	AGQ	Minco	MIO
Ariana Resources	AAU	Mincorp	MOP
ATH Resources	ATH	Minera IRL	MIRL
Aurum Mining	AUR	Minerals Securities	MXX
Avocet Mining	AVM	Minerva Resources	MVA
Baobab Resources	BAO	Minmet	MNT
Berkeley Resources	BKY	Monterrico Metals	MNA
Bezant Resources	BZT	Monto Minerals	MON

Bezant Resources	BZT	Monto Minerals	MON
Braemore Resources	BRR	Moto Goldmines	MOE
Brazilian Diamonds	BDY	Moydow Mines International	MOY
Brinkley Mining	BRM	Murchison United	MUU
Caledon Resources	CDN	Mwana Africa	MWA
Caledonia Mining Corp	CMCL	Namibian Resources	NBR
Cambrian Mining	CBM	Nautilus Minerals	NUS
Cambridge Mineral Resources	CMR	Neptune Minerals	NPM
Cape Diamonds	CAPE	Niger Uranium	URU
Cape Lambert Iron Ore	CLIO	Nikanor	NKR
Carnegie Minerals	CME	Norseman Gold	NGL
Celtic Resources Holdings	CER	North River Resources	NRRP
Centamin Egypt	CEY	Noventa	NVTA
Central African Mining & Exploration	CFM	Oriel Resources	ORI
Central China Goldfields	GGG	Ormonde Mining	ORM
Chaarat Gold Holdings	CGH	Ovoca Gold	OVG
China Goldmines	CGM	Oxus Gold	OXS
Chromex Mining	CHX	Pan African Resources	PAF
Cluff Gold	CLF	Pan Pacific Aggregates	PPA
Coal International	CLN	Pangea DiamondFields	PDF
Coal of Africa	CZA	Patagonia Gold	PGD
Connemara Mining Company	CON	Peninsular Gold	PGL
Conroy Diamonds & Gold	CDG	Persian Gold	PNG
Consolidated Minerals	CNM	Peter Hambro Mining	POG
Copper Resources Corp	CRC	Petmin	PTMN
Crimson Tide	TIDE	Petra Diamonds	PDL
Diamondcorp	DCP	Platinum Australia	PLAA
Discovery Metals	DME	Platinum Mining Corporation of India	PMCI
Dwyka Diamonds	DWY	Platmin	PPN
Eastern Platinum	ELR	Plectrum Petroleum	PPE
EMED Mining Public	EMED	Rambler Metals and Mining	RMM
Energybuild Group	EBG	Red Rock Resources	RRR
Eurasia Mining	EUA	Regency Mines	RGM
Eurogold	EUG	Ridge Mining	RDG
European Goldfields	EGU	River Diamonds	RVD
European Minerals Corp	EUM	Rusina Mining NL	RMLA
European Nickel	ENK	Sanatana Diamonds	SAN

Everfor Diamonds	EVE	Serabi Mining	SRB
Falkland Gold & Minerals	FGML	Shanta Gold	SHG
Finders Resources	FND	Sirius Exploration	SXX
Firestone Diamonds	FDI	Solana Resources	SORL
Frontier Mining	FML	Solomon Gold	SOLG
Galahad Gold	GLA	South China Resources	SCR
Galantas Gold Corporation	GAL	Strategic Natural Resources	SNRP
GCM Resources	GCM	Stratex International	STI
Gemfields Resources	GEM	Sunrise Diamonds	SDS
Gippsland	GIP	Sylvania Resources	SLV
Gladstone Pacific Nickel	GPN	Tanzanite One	TNZ
Glencar Mining	GEX	Target Resources	TGT
GMA Resources	GMA	Tertiary Minerals	TYM
Goldplat	GDP	Thistle Mining	TMG
GoldStone Resources	GRL	Thor Mining	THR
Greatland Gold	GGP	Tianshan Goldfields	TGF
Greystar Resources	GSL	Titanium Resources Group	TXR
Griffin Mining	GFM	Tower Resources	TRP
Hambledon Mining	HMB	Trans-Siberian Gold	TSG
Herencia Resources	HER	Triple Plate Junction	TPJ
Hidefield Gold	HIF	UMC Energy	UEP
Highland Gold Mining	HGM	Union Resources	URL
Horizonte Minerals	HZM	Uruguay Mineral Exploration	UGY
Jubilee Platinum	JLP	Van Dieman Mines	VDM
Kalahari Minerals	KAH	Vane Minerals	VML
Kalimantan Gold Corporation	KLG	Weatherly International	WTI
Kanyon	KNYN	West African Diamonds	WAD
Karelian Diamond Resources	KDR	Western Canadian Coal	WTN
KEFI Minerals	KEFI	Xceldiam	XLD
Kimberley Diamond Company NL	KDC	Zambezi Resources	ZRL
KimCor Diamonds	KIM	Zeehan Zinc	ZZL
Kirkland Lake Gold	KGI	ZincOx Resources	ZOX
Kiwara	KIW		

Note: The above AIM listed companies are not all incorporated in the UK, neither is their AIM listing necessarily their prime listing.

Despite the revival of London as a leading centre for mining, the sector is still regarded by parts of the local broking community as something of a mystery, an issue which we touched on earlier and which we will be going into later on. Despite that, the London market is a well regulated one, with good investor protection, and the legislative base (including taxation) which rules the activities of UK mining companies is considered both reasonable and secure. Investors can therefore be reassured that investments made in UK mining companies are safe from the point of view of local incorporation and the stock market. But in saying this we cannot obviously guarantee that the overseas mining operations of the companies would be protected *in extremis*, say in the event of nationalisation or of radical changes to how a local industry operates.

International mining companies re-incorporating in the UK

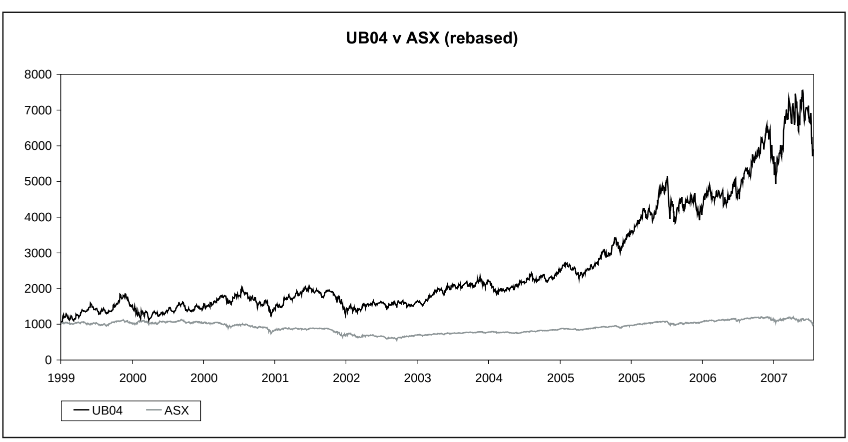
One of the more interesting recent developments has been the trend towards foreign mining companies listing in London, and as part of the process re-incorporating themselves in the UK or in a UK jurisdiction like the Channel Islands. Whilst the arrival of BHP Billiton and Anglo American some years ago was really a case of welcoming old friends who had had a secondary listing in London for decades, the recent main listings and UK re-incorporation of ENRC, Ferrexpo, Fresnillo, Hochschild, Kazakhmys, KazakhGold and Vedanta was a different matter and underlined the remarkable recovery of London's mining reputation.

The flow of companies heading to London continues and the geographical spread is also widening. We have already seen Ukrainian iron ore miner Ferrexpo listing in London and joining the FTSE100. Fresnillo, the gold and silver arm of Mexican mining group Penoles, has also completed its London listing and fund raising as the book went to print and was expected to join the FTSE100 during summer 2008. This would bring the number of mining companies in the Index to 11.

The Kazakh companies were of particular interest because the UK's connections with the former Soviet Union have not historically been that close, although since Kazakh's independence inward investment from the UK has grown rapidly. For their part the Kazakh companies had big ambitions and needed the freedom and capital sources that London afforded them to plan and finance their expansion. Whether or not the Kazakh government will in time get itchy about some of its biggest corporates being legally non Kazakh and registered in a foreign jurisdiction one cannot tell, but it is something that needs constant monitoring. The same goes for Vedanta, which despite its large Zambian investment remains primarily an Indian company, and for Hochschild with its large exposure to Peru, a country historically prone to radical periods.

There has also been a considerable number of small AIM listed UK companies putting together exploration and mine development programmes in the former Soviet Union countries, the 'stans'. Unfortunately some of these ventures have been much tougher than perhaps originally envisaged. Oxus Gold operating in Uzbekistan and Kyrgyzstan has encountered many problems relating to project ownership and taxes, and over the last five years has traded erratically between 15p and 80p. Palladex, which had leases in Kyrgyzstan, found the going too difficult and has pulled out to re-invent itself as an African exploration play, an area of the world where UK mining companies seem more comfortable.

Chart 2.1 FTSE350 Mining [UB04] v FTSE All-Share [ASX]



Source: Datastream

Johannesburg

Over the last ten years or so it could be argued that Johannesburg has lost out to London as mining companies have relocated to the City. It has also lost out to the US in terms of influencing mining share price levels, certainly in the area of gold shares, due to the high level of SA gold share ownership in the US. Although South Africa remains a major mining country it has lost some ground, as mentioned earlier, to North and South America and to Australia and other Far Eastern countries. It also lists significantly less mining companies on the stock exchange than formerly, and of those left, important ones like Anglo American and BHP Billiton only maintain a secondary listing in Johannesburg. Nevertheless, the JSE Securities Exchange in conjunction with the FTSE have two main indices for mining: the Resource 20 Index covering the biggest mining stocks, and a Gold Index which is a shadow of its former self containing only six companies.

However, the decline cannot be laid at the door of the Johannesburg exchange itself. I am also satisfied that national law and local regulation are reasonably satisfactory as they relate to the operations of the stock exchange, and thus to the financial security of investors. Unfortunately there is the issue of 'goal post' moving, and recent action with regard to black empowerment, the Mining Charter and royalties does act as a warning that the circumstances under which mining companies operate in South Africa can change suddenly. I do remain happy, however, that the regulatory and legislative framework under which the exchange functions is sound, although the dealing system which embraces a de-materialised (paperless) settlement approach can create problems for small foreign investors.

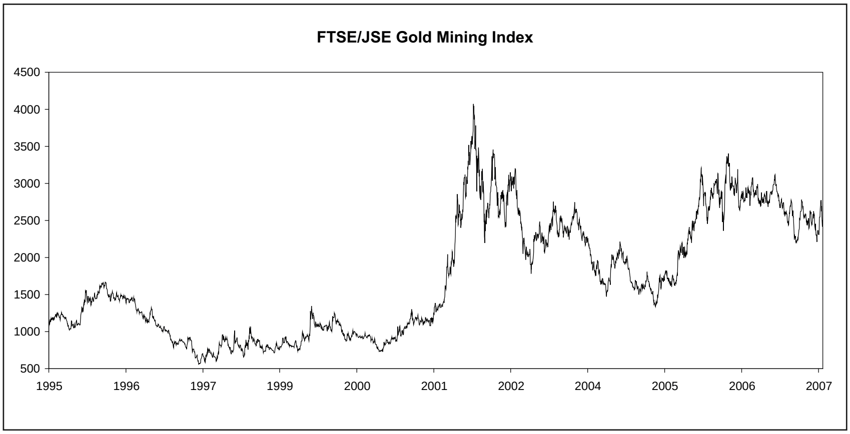
The growing cloud

If there is one growing cloud on the South African horizon it is the political dominance of the post-apartheid government by the African National Congress (ANC). Post-colonial Africa is littered with the debris of failed democratic structures in the form of banned or destroyed political opposition parties. The complete dominance of South African politics by the ANC means that a less enlightened philosophy than currently pertains in the Party could be very unsettling. There would be very little that foreign investors could do to protect themselves if a future radical ANC leader decided to go down the path that Zimbabwe turned onto six years ago. It is also the case that foreign exchange controls in South Africa, though much loosened since the apartheid era, can be used in an erratic manner. An example of this was when Anglo American, South Africa's premier corporation with massive local assets, was allowed to migrate overseas but permission to do the same was refused to Randgold & Exploration, a mining group with almost no local assets at the time.

A trend towards big banks, big funds and big companies

The globalisation of securities markets over the last fifteen or so years has led to the emergence of a relatively small number of international investment banks and stockbrokers. Some markets have adapted quite well in that they have kept a reasonably strong layer of purely local firms in the market, albeit below the level of the global giants. South Africa's market is now dominated by a few major firms, many of them globally controlled and the country's institutional investors are likewise dominated by a few very large groups. Since the market itself is dominated by a relatively small number of very large companies, smaller companies have a struggle to attract investor attention and interest, admittedly something that is not unique to South Africa. This is one of the main reasons that, despite the interest in establishing smaller companies to assist the Government's black empowerment policy, smaller mining companies are still quite thin on the ground. However, there have been signs of smaller players appearing in the securities industry on both the buy and sell side in South Africa, some of them as a result of black empowerment, and this may well be helpful over the medium term. There has also been one important liberalisation in recent years where the government has allowed foreign companies with large South African operations to seek a secondary listing in Johannesburg and for South African investors to buy shares in these companies without affecting their annual foreign investment allowance.

Chart 2.2 FTSE/JSE Gold Mining Index



Source: Datastream

Sydney

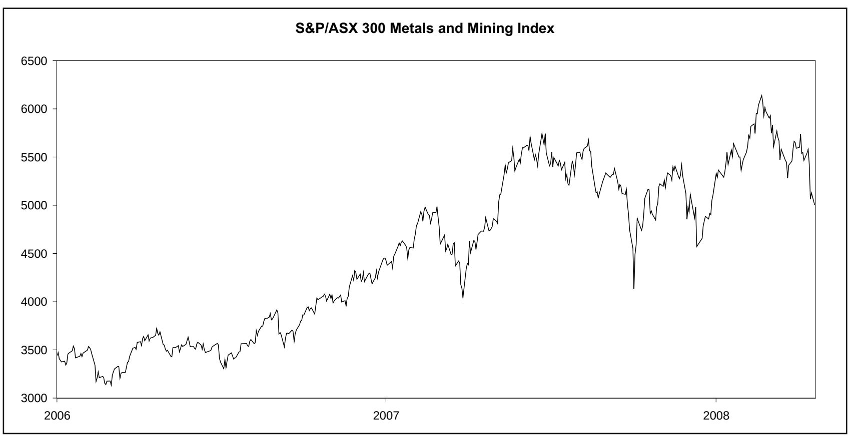
The Australian mining scene fortunately appears to be well past the nationalistic wobbles of the 70s when the foreign ownership of mining resources was a very hot political issue. The legislative and regulatory background to both stock exchange and country is encouraging towards foreign investment, although Aussie national pride can never be completely discounted. There is also the quirky rule that in takeovers over half the shareholders of a company by number, not by shares owned, must support a takeover before it can go through. The legal framework is familiarly Anglo-Saxon and the needs of both private and institutional investors are well catered for in the stock exchange’s CHESS settlement system. One of the things that materially helps investor confidence in Australia, and indeed in all the main mining markets, is the fact that English is the native or dominant business language. That means that investors can readily understand the operational basis and cultural backgrounds of these markets.

No longer a key mining market

Looking at the Australian mining market as a magnet for investors, it no longer has quite the array of major investments that it had a few years ago due to the activities of foreign majors and the consolidation through takeovers of the sector. Whilst this confirms that Sydney is a true free market, the contraction in Australian ownership of many mining companies means that it is no longer a key mining market. However, it retains the entrepreneurial character that has fuelled past mining bull markets, and the geological potential of Australia, allied with its investor-friendly background, suggests that it is capable of hosting future bull markets. To this end Sydney maintains a vigorous junior mining sector which is active both in Australia and overseas. However, the local market does not always give full credit for overseas success, a fact that drove Aquarius Platinum, with its successful South African operations, to move its main listing to the UK. The main Australian indices covering the mining sector are the Metals and Mining sub sector and the Gold index.

There is also some evidence that Australian investors are less enamoured of mining shares these days which means the shrinkage of the sector has led to few tears being shed. Whatever the truth of this it is unsurprising that in the period up to 2003, when mining as a sector very much occupied the shadows of the market in deference to high tech, telecoms and media, Australian entrepreneurs and investors sought out new pastures for profitable exploitation. There have been recent signs of a revival, however, in new mining listings and financings in Australia, although this has very much been with the support of overseas investors.

Chart 2.3 S&P/ASX 300 Metals and Mining Index



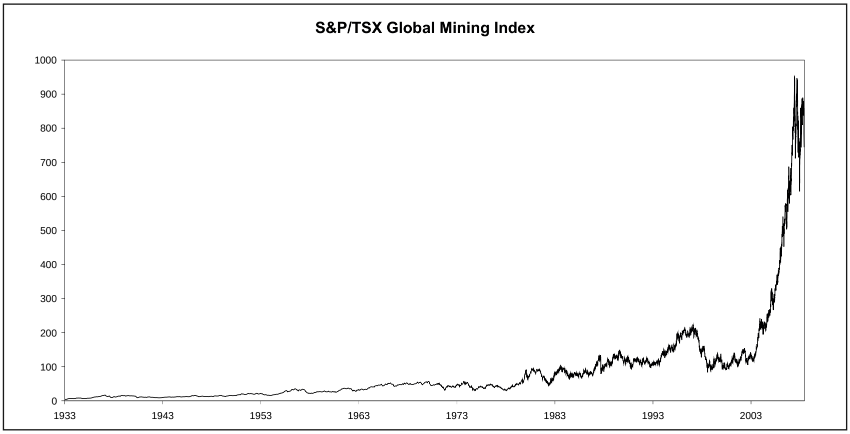
Source: Datastream

Toronto

Over the years Canada has proved its credentials as a major market with a full range of mining companies in which to invest, from giants such as Barrick right down to highly speculative exploration plays. However, in an age when global reach and thus size has assumed great importance Canada has lost quite a number of major companies in the sector's M&A frenzy, with Falconbridge which itself had merged with Noranda, Inco and Alcan, all attracting foreign buyers. Despite this the country retains arguably the most active junior mining sector of any stock exchange, which is supported by helpful tax reliefs for local investors at the seedcorn level. Canada does have a political tradition of electing left of centre governments from time to time, and some of the provinces have in the past had quite radical, even socialist, administrations, British Columbia and Manitoba being two examples. On the whole though the country's mining industry has managed to prosper despite occasionally choppy political waters. The, at times, fractious relationship between francophone Quebec and the rest of Canada has also on occasions adversely coloured external perceptions about Canada as a place to invest in.

Today, Canada's political stability and its adherence to market economy principles underpin its globally orientated mining industry. The Bre-X scandal, mentioned earlier and into which we will go in more detail later, was a wake-up call for the Canadian broking industry. In recent years we have seen the notorious Vancouver market, where the junior exploration companies were almost all listed, metamorphose into the TSX Venture Exchange to improve regulation and investor protection. It is, however, important to note that foreign investors are needed to push on junior stocks after the tax-efficient initial financing done by private local investors. Canada's conservative institutional investors only become involved, as a rule, when the ugly duckling has become a high market value swan. This strategy proved disastrous in the case of Bre-X in the 90s, which became a fully listed TSE 300 company attracting blue-chip Canadian institutions just before keeling over. The main Toronto indices covering the mining market are the Diversified Metals and Mining and the Global Gold and Global Mining indices.

Chart 2.4: S&P/TSX Global Mining Index



Source: Datastream

New York

The disaster of the Wall Street crash and the depression in the 30s led to the establishment of a securities regime in the US which was highly regulated, and well ahead of the rest of the world. Commercial banks were also separated from investment banks (brokers) due to the conflicts of interest endemic in the consolidation of the two very different kinds of securities business. We see these conflicts of interest again today in the liberalised climate that has slowly evolved in the US since Wall Street's big bang in 1975. Theoretically, though, New York is one of the safest markets in which to invest with strong regulators in the form of the SEC and a comprehensive rule book. Over the last year there has been some concern that the new tightened corporate reporting regulations following the Sarbanes Oxley Act will lead to less foreign companies (US companies have no escape) wanting to list on US exchanges. For the moment none of the overseas miners listed have tried to leave, but many of them have sizeable numbers of US investors, and companies with significant US interest do not escape Sarbanes by simply abandoning their US quote.

The small number of US incorporated mining stocks, of which only a handful are of any size, means that the sector has attracted little attention from the mainstream US broking community in recent years. There have been far more attractive high growth (sic) sectors to get involved in than mining, and those US investors interested in mining have tended to buy overseas stocks.

Whilst the New York Stock Exchange remains the premier trading floor in the US it is still the case that a number of overseas mining companies have obtained listings on NASDAQ, once almost as big a force in trading South African gold shares as Johannesburg but now world famous as the main market for high-tech issues. New York itself has virtually all the US mining groups of any significance listed and a good few foreigners such as AngloGold Ashanti and Gold Fields. It also lists major mining companies from more exotic countries like the Peruvian gold miner Buenaventura. The other exchanges with mining links are Philadelphia and the American SE, which respectively run the main gold share index, XAU, and the Gold Bugs Index, HUI; the components of which appear in the following tables. The XAU broadly features the largest gold producers and the HUI is composed of companies opposed to hedging. Some small and speculative native US mining companies have trading facilities on the informal OTC (Over The Counter) market in the US.

Table 2.4 XAU Components (August 2007)

Company	Code	Country of incorporation
Newmont Mining	NEM	US
Barrick Gold	ABX	Canada
AngloGold	AU	South Africa
Gold Fields	GFI	South Africa
Freeport McMoran Copper & Gold	FCX	US
Harmony Gold	HMY	South Africa
Goldcorp	GG	Canada
Kinross	KGC	Canada
Meridian Gold	MDG	Canada
Agnico Eagle	AEM	Canada
Pan American Silver	PAAS	US
Silver Standard	SSRI	US
Royal Gold	RGLD	US
Yamana Gold	AUY	Canada
Coeur d'Alene	CDE	US
Randgold Resources	GOLD	UK

Note: Since August 2007, Meridian has been acquired by Canadian gold group Yamana.

Table 2.5 HUI components (August 2007)

Company	Code	Country of incorporation
Agnico Eagle	AEM	Canada
Coeur d'Alene	CDE	US
Eldorado	EGO	Canada
Freeport McMoran Copper & Gold	FCX	US
Gold Fields	GFI	South Africa
Goldcorp	GG	Canada
Randgold Resources	GOLD	UK
Golden Star	GSS	Canada
Hecla Mining	HL	US
Harmony Gold	HMY	South Africa
IAMGold	IAG	Canada
Kinross Gold	KGC	Canada
Meridian Gold	MDG	Canada
Newmont Mining	NEM	US

Note: Since August 2007, Meridian has been acquired by Canadian gold group Yamana.

Other markets

Although the main mining share markets cover the bulk of the major mining groups, be they locally incorporated or foreign companies, some mining shares do trade in unusual locations as well. Others have listings in foreign markets because of particular interest in their shares in that country. On the whole it is probably better to trade in the main mining markets when you can, but that is a subject that we will be going into in more detail later.

Looking at the non-mainstream markets where mining shares are listed and dealt I would make the following observations. Most of the markets, many of which are new and have been structured along lines agreed with the International Finance Corp, have understandable and relatively robust regulations, offering investors some degree of comfort if they deal in them. However, the example of the Russian market in the later 90s when some companies simply expunged from the register the holdings of some investors which they didn't like, does give investors reason to pause. The situation has still not stabilised, as evidenced by what has gone on in the oil and gas sector where state controlled companies have muscled in on formerly foreign controlled projects. There is also the problem that despite a strong regulatory background smaller markets in countries with a volatile political history are always at risk from a government simply changing the rules and forcing its stock exchange to comply to the disadvantage of foreign shareholders. History, unfortunately, is littered with examples of expropriation without compensation of foreign shareholdings – revolutionary Russia and Maoist China would be two examples. It is interesting to note that at the end of 2003 the Chinese floated Fujian Zijin Mining, a mainland gold mining company, in Hong Kong to huge enthusiasm. China's economic boom and consequent thirst for metals and minerals has spawned further mining issues in the last couple of years.

Markets where mining shares are traded and which are open to foreign investors include:

- **Zambia**, where ZCCM Investments (formerly Zambia Consolidated Copper Mines) is listed. The market is small, as most of the shares are owned by the Zambian Government, but around 13% are in private hands, mostly overseas with London, Brussels and New York making a generally thin market and Paris a rather larger market.
- Kuala Lumpur trades what is left of the **Malaysian** tin mining industry and is a serious Far Eastern market. However, its response to the near Asian market meltdown of the late 90s was to lock foreigners into their holdings by denying them the right to repatriate sales proceeds for a couple of years. This action undermined its free/liquid market status.
- **Mexico** has, in Grupo Mexico, a mining giant, and in the wake of the North American trading zone the market there is reasonably well regulated, but investors nervous about Mexico's past might be more comfortable with the ADRs listed in New York.
- The same might be said for investors interested in **Peru's** Buenaventura but perhaps uncertain about the standard of regulation in the Lima market.
- In a similar vein, black Africa's leading gold mine Ashanti, now merged with AngloGold, had listings in both **Ghana** and **Zimbabwe** (the latter one has been dropped), but London, the location of its primary listing, or New York probably again provided a more reassuring dealing environment for most investors.
- Both the **Philippines** and **Indonesia** have stock exchanges with mining sectors but much of the exploration and development of major mines in the latter country in recent years has been carried out by foreign groups. Both countries have continuing low level civil unrest which is something of a turnoff for foreign holiday makers let alone investors, and this volatility has to be weighed against the relatively rapid economic growth which both countries promise.

Many, particularly South African, mining companies have listings on European bourses with Paris, Brussels and Frankfurt/Berlin being leading centres. Indeed some stocks trade better on the Continent these days than in London, the other, less flattering side of the coin which on its face has London as the centre for the mining industry's giant groups. There has been much activity on the mining takeover front and in acquiring the target company in exchange for their shares, predators have sometimes found themselves listed in another market as a result. In Australia, AngloGold and Placer Dome (which is now part of Barrick Gold) were two examples, a third was Ashanti, now part of AngloGold, in Zimbabwe. It is unlikely that a foreign investor would want to deal in these stocks outside their main markets, but there might be pricing advantages, and therefore arbitrage opportunities, from time to time in so doing.

AIM/TSX/ASX

In recent years the rise of the Alternative Investment Market (AIM) in London has encouraged an increasing number of small mining companies to obtain a quote on AIM, sometimes alongside a listing elsewhere (usually Toronto or Australia), sometimes in preference to a listing in those centres. The reasons given for AIM's success in attracting so many resource companies, and of course this also applies to its successes in non resource sectors, is that its rule book is liberal, its costs are relatively low and London investors are global in outlook. Here we take a look at some of the listing issues to be considered for the three main junior natural resource markets; later on in the book we look at some of the issues relating to dealing in these markets. I have not considered the junior Johannesburg market, the AltX, as it is very small and only recently established.

AIM

There are two particular points made by the London Stock Exchange concerning the attractions of getting a quote on AIM:

1. the first relates to the overall **expertise** to be found in London when it comes to the mining industry, and
2. the second relates to the still relatively **light touch in regulatory terms** of trading on AIM.

I believe these are far more important reasons for coming to AIM than the also often mentioned cost of obtaining an AIM quote, where it is arguable whether AIM is in fact cheaper than its Australian and Canadian competitors.

For investors one of the issues that AIM throws up is the speculative nature of the mining companies quoted, as compared with the mostly much larger mining companies listed on London's main market. Having said that, most investors will have already made up their minds about the amount of risk they are prepared to assume when they start to look at AIM miners. It is as well to remember that though AIM is well regulated it is still done with a relatively light touch and by the LSE itself. There is also a back-up group of mining industry experts drawn largely from the broking community who advise the LSE on matters relating to AIM mining companies.

Corporate expertise in London

We have elsewhere looked at the issue of mining competence amongst London brokers and have concluded that things, after a very low ebb, have begun to improve. However, what AIM has successfully played on over the last few years is the corporate expertise in mining available in London. And even at the most depressed time, in terms of interest, during the TMT boom of the later 90s, most of the significant investment banks maintained a corporate finance capability in the sector and were able to raise development finance for projects. This ability attracted smaller foreign mining companies to try and tap the emerging AIM market which in earlier days did not have a particular large mining component. Steadily, small equity raisings through AIM began to be seen and as the metals/mining sector began to turn round, these raisings began to accelerate, taking in new IPOs as well as secondary quotations for overseas miners.

Some overseas companies have found their AIM quotation to be of benefit both from the point of view of raising finance and also because it has raised their profile; other companies have been less lucky, finding that their nominated adviser/broker has disappointed both in terms of raising money and researching and trading the stock.

The LSE is aware that a market like AIM needs informal attention to make sure that the relatively relaxed operational tone does not lead to problems for users. Apart from the special mining advisory group, the Exchange keeps an eye on the activities of advisors and if there is anything that needs attention, a quiet word will be had with the advisor in question. The Exchange will also keep an eye on the size of any AIM company and talk to them regarding the appropriate market for them to be traded on. In the mining sector Canada's First Quantum is one company which has moved from AIM to the LSE main market.

Few tax advantages for investors

For mining companies on AIM there are few if any tax advantages for their shareholders. An AIM company's London registered stock cannot go into a PEP or ISA in the UK unless its primary listing is in a foreign market and the foreign stock would be 'pepable' in its own right, and neither does it qualify for the UK inheritance tax relief available to a UK incorporated AIM company with UK industrial operations. An AIM stock, however, can be held in UK pension funds. The regulations surrounding these AIM reliefs and strictures are sometimes difficult to comprehend, but usually relate to the authorities' decision that AIM is not a proper stock exchange, a view that may surprise active investors.

TSX

Canada's junior market is the TSX Venture Exchange, the successor to the Vancouver Stock Exchange – an exchange with a reputation for often wild behaviour in the past. In today's regulated environment the Venture Exchange operates in a more restrained manner though it still retains a strong entrepreneurial character.

The listing costs for new companies are not particularly onerous, and there can be tax breaks for Canadian taxpayers in the form of flow-through financing where a natural resources company raises equity (solely for exploration) from investors who can write off their investment against income tax. Canadian junior miners have been operating overseas for quite a number of years now so Canadian investors have developed some taste for such risk. Many juniors, though, do still tend to favour Canadian and US ventures, and on the whole Canadian investors are more comfortable in their own backyard. Indeed, many Canadian juniors sport sizeable foreign shareholdings on their register; by way of contrast UK incorporated AIM miners often have few foreign shareholders.

ASX

Australia's ASX does not have a separate junior exchange and its many exploration companies trade alongside the mining majors. Australian investors tend to be less comfortable with mining juniors which have sizeable interests overseas, and these juniors often have to head for Europe and the UK for funds which in turn can lead to an AIM quote and even, as with Aquarius Platinum, a change of incorporation.

The interesting thing here is that Aussie mining executives and promoters do not seem to have the same concerns about operating and exploring overseas as do local investors. However, if you were a private exploration company with interests in Africa or Latin America and looking for a market to float on, it would be AIM or possibly the TSX but it would be unlikely to be the ASX. Having said that, liquidity in the junior sector on both the TSX Venture Exchange and the ASX is often deeper than on AIM, particularly where there is a dual listing. In terms of dealing AIM has to labour with relatively high stamp duty, and where a Canadian or an Australian company has a secondary AIM quotation it often pays to deal in Toronto or Sydney rather than London (see later in the book) for cheapness and liquidity.

Summary key characteristics of the three markets

The key characteristics of the three main junior mining markets are:

AIM

- Largely consists of international junior and exploration companies
- Although global in outlook, AIM miners have a tendency to be Africa orientated
- Russia and the 'Stans' are also well represented
- Light touch regulation but LSE controlled
- Not always liquid in terms of trading, spreads can be 'generous' (and not to the investor)

TSX Venture

- The sector has a strong bias towards Canada and Latin America with some African exposure
- Juniors do raise local equity but often TSX issues have keen US and European support as well
- Regulation driven by past misdeeds on the Vancouver exchange
- Generally good liquidity and tight pricing

ASX

- Arguably the most parochial of the three markets with a strong Aussie emphasis although there is some interest in Africa and Asia
- Those Aussie juniors with an overseas emphasis often have an AIM listing as well
- Strong regulation
- Satisfactory liquidity

3. Mining Shares

We now come to the meat of our look at the broad mining sector, mining shares themselves.

We have already touched on a number of mining companies when we looked at the metals sector, and in some detail in the case of gold. The following part of the book is divided up into several segments relating to mining shares. Firstly we look at the various categories of shares, from large diversified companies like mining houses down to the small mining company sector. This categorisation of the sector by size allows investors to choose the degree of risk they are prepared to tolerate in what can be a highly volatile investment area. Mining share funds are also considered. We also look at mining market cycles, how to build a mining share portfolio and what to look for in results and exploration announcements.

Pre-flight checks

To begin with, however, it is important that anyone contemplating an investment in the mining sector should go through a few 'pre-flight checks'. Having identified a mining company that is of interest it is worthwhile collating some background information.

1. First establish the country of incorporation of the company and where it is listed, with particular attention to the issue of the best market to deal in.
2. Get hold of the company accounts and other relevant investor information either through the internet and the company website, or through company report distributors (explained in a later section).
3. Using the published information calculate some basic ratios to determine whether the shares are still good value (see final section on company valuations).

4. Check details on the company's directors, brokers/promoters and also the longer term history which might not feature on the company's website.

Having done this you should be in a better position to make judgements about the mining companies that have caught your attention.

Mining finance houses

The term, *mining finance house*, was originally used to describe the structure of the great South African mining groups, i.e. groups who financed exploration and the initial development stages of bringing a mineral deposit, once discovered, to production. Now the phrase is used to describe many diversified mining companies operating, usually, in a number of countries and producing a broad spread of metals. Some describe these groups as *diversified mining companies*. Whichever description is used, these companies are generally perceived as the safest group of mining stocks for those investors looking to spread the risk of being in the sector. However, investors must bear in mind that the more they try to reduce or spread risk the less upside they will experience should a metal or a country start to attract market attention.

Do you really want diversification?

A particular example of this was seen in the gold share market in 2002. After many years of underperformance gold and gold shares began to attract interest, and at a time when other equities were in a downtrend. Some brokers with no expertise or interest in gold recommended that clients, if they wanted exposure to gold, should buy Anglo American rather than one of the straight gold producers in Australia or South Africa. Although Anglo then controlled one of the largest gold producers in the world, AngloGold, it also had interests in a number of other very large undertakings including platinum, diamonds, forest products and coal. Gold consequently only contributed around 14% of its earnings. The result of buying Anglo American was that the typical 200% increase that an investor would have seen in a South African gold share, like Gold Fields or Harmony, between mid 2001 and mid 2002, would have been replaced by a thoroughly pedestrian 4% increase in the ‘safe’ Anglo. Of course when gold shares, having overreached themselves at that stage, suffered heavy profit taking and plunged in value the diversified nature of Anglo in contrast should have provided protection against that. Unfortunately as gold shares fell back they did so in step with broad equities which had a very weak summer. The result was that Anglo, Gold Fields and Harmony each fell by around 45% until the market erosion slowed right down in late July.

Since then the situation has rather reversed itself with gold leaders like Gold Fields and Harmony going nowhere when measured in sterling, which has become a rather good swing currency for global valuations in recent years, despite a near doubling of the gold price between 2003 and 2007. Even gold's surge in early 2008 past $1,000 had only a modestly positive effect as rising costs and falling production took their toll. The large mining diversifieds, however, have stormed away on the back of takeover excitement and a very strong earnings trend from base/industrial metal prices. In the 12 months from mid 2007 the UK FTSE mining index, which contains the greater proportion of the world’s major mining companies, rose 32% against a 11% fall in the UK FTSE 350, and stood at par to the wider UK market. The FTSE Gold Mines Index over the same period rose around 34%.

The number of big diversified mining companies is getting smaller

Given that the typical investor these days can buy shares in any market he chooses, the choice of big diversified groups is limited as amalgamations have created a handful of giants and a few growing groups whose ambition, unsurprisingly, is to get bigger and become giants. By now we will all be familiar with the four large diversified UK houses – Anglo American, BHP Billiton, Rio Tinto and Xstrata – and to them must be added the smaller Vedanta.

All are FTSE100 stocks, and the first four are also ranked in the FT Global 500 along with eight other global metals and mining giants. Other UK miners in the FTSE100 are Antofagasta, ENRC, Ferrexpo, Kazakhmys and Lonmin. Using the FT Global 500 as a guide, the other eight mining giants are Vale (CVRD) of Brazil, Norilsk of Russia, South Africa's Anglo Plats, Alcoa, Freeport MacMoran Copper and Southern Copper of the US and Canada's Barrick Gold and Alcan (these latter companies being single metal miners not diversified groups and Alcan having been now taken over by Rio), and that is that!

Table 3.1 Profile of diversified mining companies

	Market Cap (£bn)	Earnings from metals (%)	Geographic earnings (%)
Anglo American (Finals Dec 2007)	43.1	Platinum 21, diamonds 4, coal 8, base metals 51, industrial minerals 6, ferrous metals 10	South Africa 48, Africa 8, Europe 5, South America 44, Australia/Asia 0, North America (5)
BHP Billiton (Finals June 2007)	72	Petroleum 27, aluminium 10, base metals 18, diamonds & special products 6, coal 14, stainless steel 9, iron ore/manganese 16	Australia 49, Europe 8, North America 0, South America 34, Southern Africa 6, Rest of World 3
Rio Tinto (Finals Dec 2007)	59	Copper/gold 42, iron ore 32, energy 6, aluminium 13, industrial minerals 2, diamonds 4	North America 29, Australasia 43, South America 22, Africa 5, Indonesia 2, Europe & others 0
Vedanta (Finals Mar 2008)	8.5	Aluminium 12, copper 21, zinc 51	India/Australia 89, Zambia 11
Xstrata (Finals Dec 2007)	40.1	Coal 8, copper 47, lead/zinc 17, alloys 4, nickel 24	North America 25, Australia 22, South America 43, Europe 5, Africa 5

Source: Company reported figures

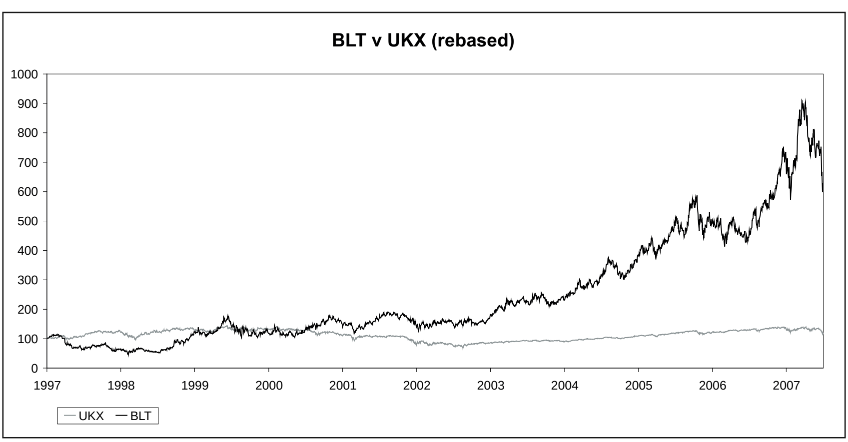
Note: The market capitalisation figures are as of June 2008, and the BHP and Rio Tinto figures incorporate the capitalisation of the Australian arms of the two companies.

How the big companies are diversified

BHP Billiton

The largest of the diversified mining groups is BHP Billiton, but the makeup of its operations is rather different from those of Anglo American and rather more like Rio Tinto's. The importance of its oil earnings gives it a very different flavour from its two main peers. It is also heavily orientated towards bulk metals and minerals – aluminium, iron ore and coal – a characteristic it shares with Rio Tinto. It has important copper interests in Chile and a diamond mine in Canada. This gives it some exposure to direct consumer demand trends and the more volatile world of spot metal pricing, where prices are set not through long-term contracts but change daily as a result of trading trends on a metal exchange such as the LME (London Metal Exchange). Its major geographical area of operations is Australia, with South America its second most important operational area not far behind. The rising influence of South America is common to many of the diversifieds. What is also interesting about BHP Billiton is that it does not have much gold or any platinum exposure, although it is involved in diamonds. Its attempt to acquire Rio Tinto does not take it in this direction but clearly seeks to underpin its prominent position in iron ore. The bid is being resisted by Rio.

Chart 3.1 BHP Billiton [BLT] v FTSE100 [UKX]

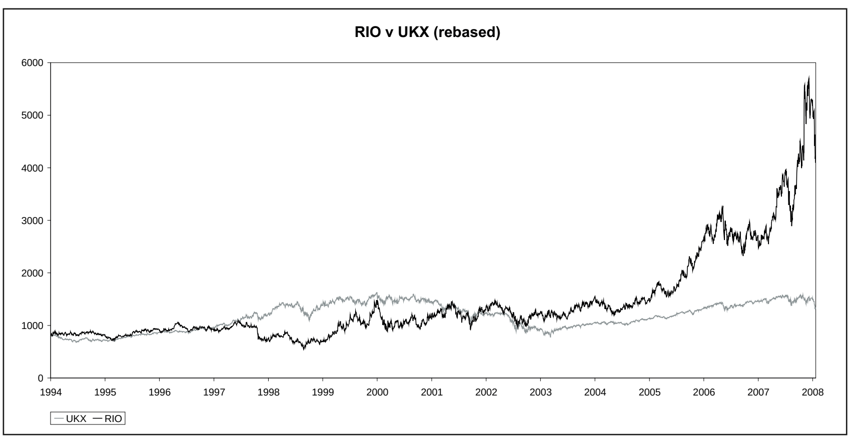


Source: Datastream

Rio Tinto

Rio Tinto has some gold interests and has developed a diamond mine in Canada, but like BHP Billiton it is primarily involved in producing bulk metals and minerals like iron ore, energy (coal) and aluminium. It also has exposure through its copper and gold interests to the spot metal markets where the mining sector as a whole gets its main earnings leverage. In terms of geography Rio Tinto is operationally heavily linked historically to Australia and the US. It is resisting the approach from BHP as it believes that its expansion plans will provide long-term growth for its shareholders, and that BHP is being opportunistic in its approach.

Chart 3.2 Rio Tinto [RIO] v FTSE100 [UKX]

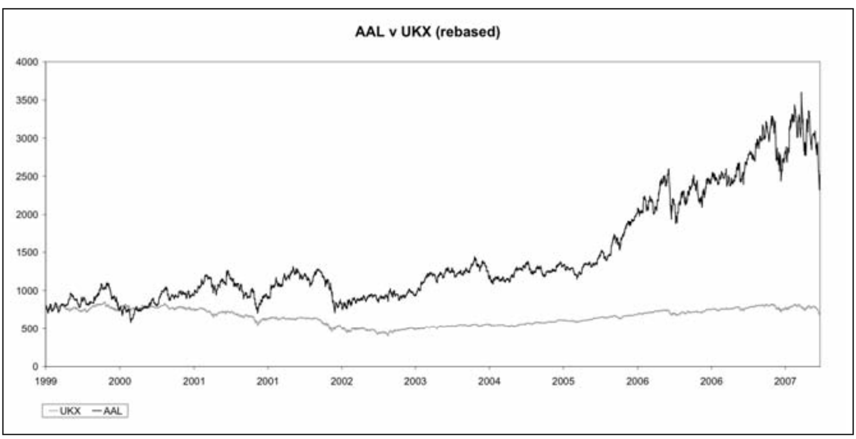


Source: Datastream

Anglo American

Anglo American has perhaps the broadest metals/minerals spread with significant exposure to platinum, diamonds, coal, industrial minerals, and ferrous and base metals. It has recently divested itself of its paper/packaging companies and the European aggregate operations may well go the same way. Historically, spot metal prices have had a greater influence on its earnings than on the earnings of the other UK giants, but that is changing as Anglo sells down its gold exposure (AngloGold Ashanti) and its peers build up their base metal operations. Geographically Anglo is still skewed towards South/southern Africa, with 49% of earnings coming from the continent in 2006. South Africa at 43% of group earnings thanks to buoyant platinum results gained in importance, as did South America. Its latest move in Brazil takes it deeper into iron ore. Recently there has been well-informed talk that Vale (CVRD) of Brazil has been looking at Anglo so Anglo's latest investment in the country is interesting.

Chart 3.3 Anglo American [AAL] v FTSE100 [UKX]

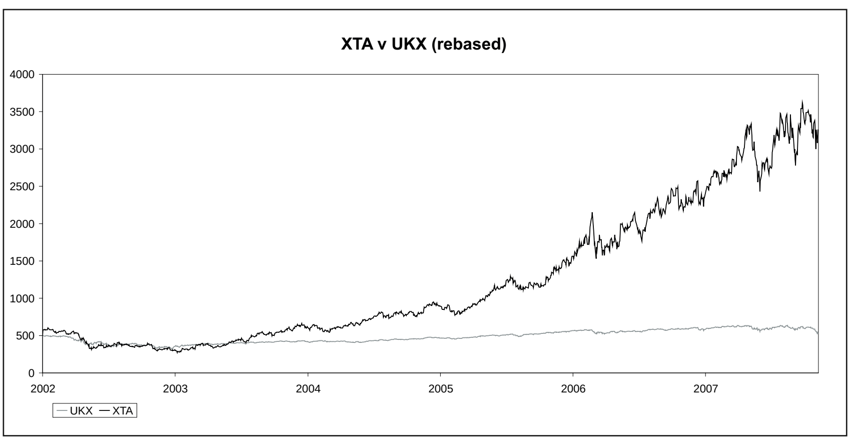


Source: Datastream

Xstrata

Xstrata's position as a coal producer, with a strong leaning towards Africa, has been transformed since it first listed back in 2002. It has acquired Australia's MIM and Canada's Falconbridge, and base metals have become very important to the group as a result. It is now better balanced as to products and countries of operation, although if current high copper prices are maintained it may become rather top heavy in that direction. Its acquisition hunger remains and its historic metals portfolio lacks any significant mainstream exposure to precious metals; the acquisition of Eland Platinum is the first move in that direction. This year Vale tried to acquire Xstrata but its approach failed.

Chart 3.4 Xstrata [XTA] v FTSE100 [UKX]



Source: Datastream

The previous charts demonstrate that investing in a large mining finance house may not always provide the expected diversification of risk, and may also divorce the investor from the spot market metal price action that drives a mining bull market.

Certainly an investor in BHP Billiton (ignoring the further complication that its oil production earnings may run in an entirely different cycle), or Rio Tinto, will be looking for volume increases from the bulk minerals side for the lion's share of any earnings advance.

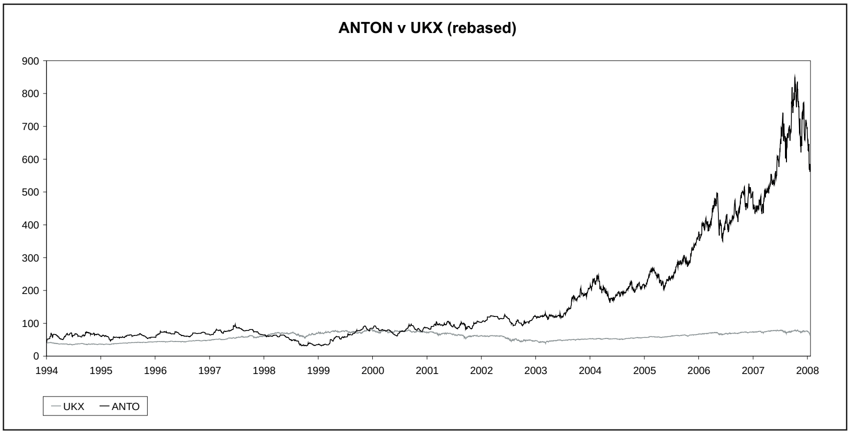
Anglo American offers a much wider diversification with good spot metal price exposure; however, it does retain its historic African focus, although that is now somewhat reduced having been 70% plus a few years ago.

Xstrata has grown rapidly by acquisition in recent years and is probably interested in further mergers or tie-ups. At this current stage of its development it is also the most heavily influenced of the big UK four miners by the base metal cycle, which increases the volatility of its earnings. At the moment with base metals still quite strong that is a plus, but when the cycle turns down, its earnings will come under pressure so some widening of its metals spread is logical.

Antofagasta

This point can also be made about Antofagasta, whose earnings are entirely drawn from Chile, 98% of which are in respect of its copper mining operations there, giving it little risk diversification, although 15% of its metals revenue come from, primarily, molybdenum by-product. It has a half stake in Tethyan Copper which has a large low grade copper/gold prospect in Pakistan, a major geographical diversification for the Group. It also has exploration projects in South America outside Chile.

Chart 3.5 Antofagasta [ANTO] v FTSE100 [UKX]



Source: Datastream

Eurasian Natural Resources

One of the quirks of the modern London Stock Exchange is that it accepts for listing and inclusion in its UK series of indices, companies who have no prior connection with either London or the UK. Listed in London at the end of 2007 some time after its compatriot Kazakhmys (see overleaf), ENRC is a diversified group with interests in ferroalloys, iron ore, alumina/aluminium and energy. These activities are volume driven and are less sensitive to sudden product price movements than would be a copper miner. ENRC's current operations are all in Kazakhstan, although there are plans to expand into Russia. The Kazakhstan Government has a stake in ENRC as does copper miner Kazakhmys, and it is the wish of the Government for the two companies in due course to combine into one national champion.

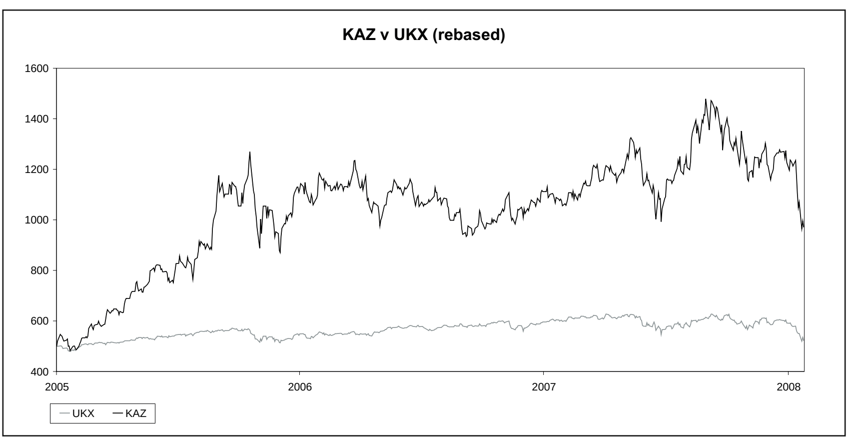
Ferrexpo

A very recent addition to the UK mining companies in the FTSE100 from another ex-Soviet location, this time the Ukraine, is Ferrexpo. The company which listed in London in June 2007 has its headquarters in Switzerland, but qualifies for inclusion in UK indices as it is incorporated in the UK. Its prime area of activity is iron ore in the Ukraine, where it is undergoing a major expansion of iron pellet operations.

Kazakhmys

The giant Kazakh copper producer, Kazakhmys, is another and earlier Kazakhstan stock to list in London. The reason for the decision to come to London was the company's belief that it would get nowhere by listing only on its local market and that London gave it exposure to both equity investors and experienced mining bankers. Apart from a refining operation in Germany, Kazakhmys is entirely rooted in copper mining in Kazakhstan. In that sense it is structurally similar to Antofagasta which has virtually all its eggs in Chile for the moment and in copper. Currently, Kazakhmys is generating substantial cash flows and is involved in corporate discussions with Eurasian Natural Resources, which have so far been inconclusive although Kazakhmys has taken a stake in ENRC (see previous page).

Chart 3.6 Kazakhmys [KAZ] v FTSE100 [UKX]

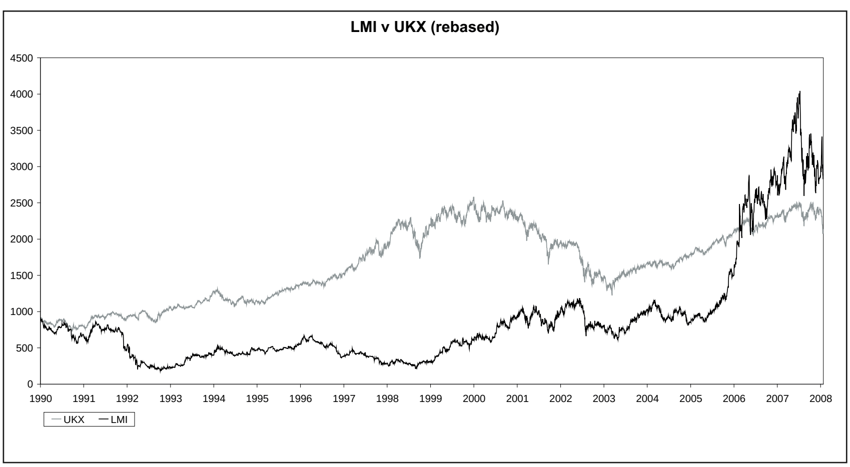


Source: Datastream

Lonmin

It is interesting to see the return of Lonmin to the Footsie; when it was a constituent in the 90s it was a very different animal, with African industrial interests and gold mining in Ghana. It now concentrates on platinum mining in South Africa and over the last two years has made two significant acquisitions of Canadian juniors, Southern Platinum and Afriore, with large PGM resources on the Bushveld. There has been talk in recent years about diversifying the metals portfolio but despite the odd technical setback in both the mining and treatment areas Lonmin seems happy to hitch its star to platinum. Being rather small in terms of the Footsie mining giants, Lonmin is often thought of as a certain target in due course for a predator looking for long term PGM assets. Xstrata with its African exposure savagely reduced and modest precious metal interests is one possible bidder.

Chart 3.7 Lonmin [LMI] v FTSE100 [UKX]

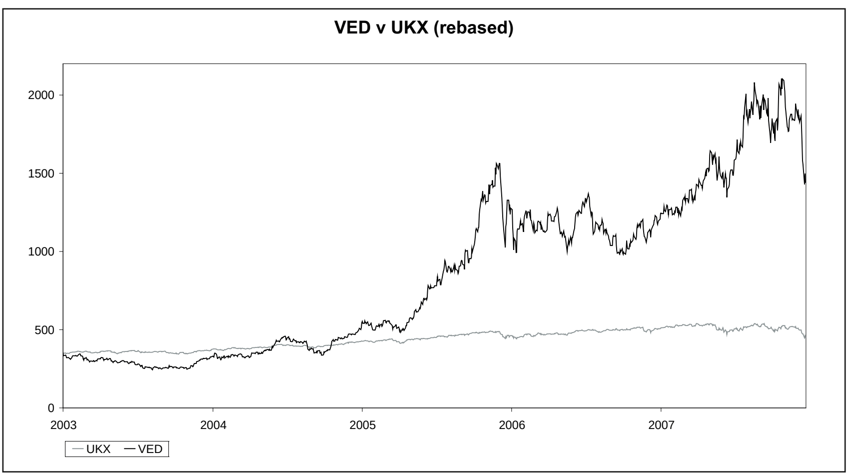


Source: Datastream

Vedanta

Vedanta with its large Indian mining interests and its growing presence on the Zambian copperbelt is another London refugee. It is a little better spread in operational terms with aluminium and zinc as well as copper. The standing of London in the world mining securities arena was clearly a pull. The Bombay Stock Exchange is an increasingly important trading market but mining is not yet established as a prime sector for Indian investors, despite the national appetite for gold. Vedanta's sortie into Africa is also something London understands, and the company is planning to sink a large sum of money into the development of the Konkola Deep mine. Vedanta has bought out ZCI's 28.4% stake in Konkola and has also launched an ambitious corporate expansion with major investments in Indian metals and mining. It has also agreed to buy ASARCO, the US base metal mining subsidiary of Grupo Mexico, out of administration in the US. Expenditure on this programme of investment and acquisition comes to over $10 billion, adding substantially to Vedanta's long-term earnings potential.

Chart 3.8 Vedanta [VED] v FTSE100 [UKX]



Source: Datastream

Results reported and dividends declared in US dollars

An additional point to be aware of is that though these companies are incorporated in the UK they report their results in US dollars, partly because most metal prices are in US dollars. Since a large proportion of their operations are in countries like Australia, Canada and South Africa where their costs are in local currencies, exchange rate movements can be important, and the former two currencies have in the mid 2000s been strong against the US dollar. So even though metal/mineral prices may be rising, if the US dollar is weak then margins at these foreign operations may be squeezed as local costs, when converted into US dollars for the results, can rise faster than revenues. This has particularly been the case with the gold mining industry.

There is also another issue that particularly UK shareholders of UK diversifieds need to consider. As earnings are reported in US dollars so are dividends declared in the US currency, although they can be converted for payment purposes. This means that with sterling rising against the dollar what might appear to be quite juicy dividend increases in dollars are less exciting or even non-existent when converted into sterling. Of course if the revenues earned are in US dollars then the profits, and therefore underlying dividends, will be importantly influenced by the strength or otherwise of the US currency. But I do wonder sometimes if boards, when considering the level of dividend, pay enough attention to the currency in which ultimately the dividend will be received.

If one looks at Anglo American's dividend payments over the last five years the following picture emerges.

Table 3.2 Dividends/earnings in US$ for Anglo American

	2002	2003	2004	2005*	2006*
EPS (US$)	1.25	1.20	1.87	2.58	3.73
DPS (US$)	0.51	0.54	0.70	0.90	1.08
Dividend cover	2.5	2.2	2.7	2.9	3.5
DPS % increase (US$)	4.1	5.9	29.6	28.6	20.0
DPS % increase (UK£)	(5.7)	(7.0)	24.2	38.9	7.6

* Does not include special dividend

As can be seen the experience of a shareholder who receives and spends their dividends in dollars has been rather different, and better, than the experience of the sterling shareholder, although there was one bright year, 2005, for the sterling investor. So wedded are many UK international companies to using the US dollar in their accounts that there is little prospect of them reverting to sterling, and that applies with particular force to mining and oil companies. Bearing this in mind, sterling investors need to be aware of potential dividend underperformance. It must be noted, however, that this structure does make these companies and their payouts defensive and maybe even attractive if sterling starts to weaken against the greenback.

A hand-picked portfolio of mining shares

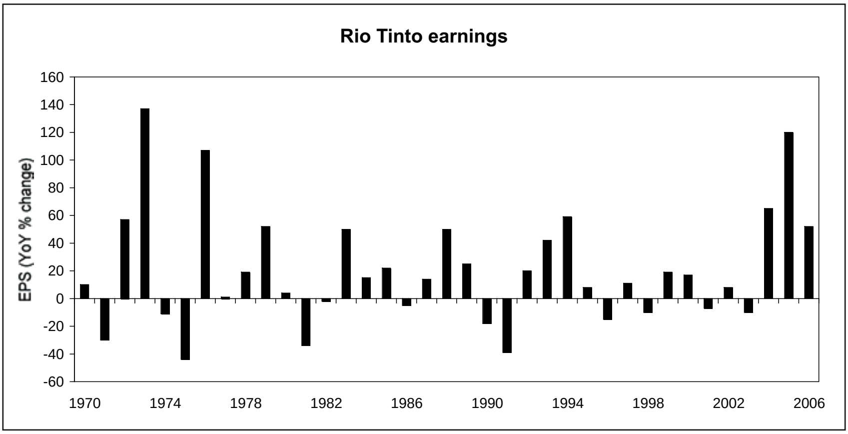
One of the other key ideas behind buying a mining finance house share is that it can act as a substitute for a hand-picked and balanced portfolio of individual mining shares, and thus take the strain out of investing in a sector with perhaps too many potential pitfalls for those not familiar with how it works. Historically this was not a bad idea, and when one looked at the old Anglo American of South Africa you were effectively buying an investment trust consisting of many separately listed South African mining shares, and often at a discount, although most of the companies involved were controlled by Anglo.

Volume can mitigate metal price volatility

Today we are faced with a small number of large mining houses with a core of operations covering bulk metals and minerals where price is less the issue than volume. That means that when economic growth slows, earnings from these interests are more affected by the prospect of a drop in volume than of price weakness. Whilst that leads inevitably to lower profits, as does a drop in the price of spot priced metals like copper and zinc, the prices of the latter are much more volatile than prices of industrial minerals where contract prices are more prevalent, and changes are often less dramatic because customers foremost value security of supply. However, in recent years many of the mining majors have been active on acquisitions leading to an increase in exposure to spot priced metals such as copper. This inevitably means that some of the earnings stability of the difficult 90s may be lost should metals enter a down cycle. An example of this would be a comparison of the range of Rio Tinto's historic earnings through the cycle, being primarily driven by spot metal trends in the 70s, by its bulk mineral operations in the 90s, and now today spot price derived earnings are once more increasing in importance.

The point is illustrated in Chart 3.10 and Table 3.3 by showing the percentage changes in Rio Tinto's earnings per share since 1970. Up until 1995 earnings expanded and contracted sharply, the recessions of the mid 70s, early 80s and early 90s showing up quite clearly with periods of rapid growth in between. This growth was a consequence of both the company's sustained operational growth and the favourable expansion of world economies over the twenty plus years since the near catastrophic inflation of the mid 70s. Between 1995 and 2003, earnings became structurally more stable enabling the group to ride out the difficult economic climate between 2000 and 2003. When the present up cycle in metal prices runs its course we might well see Rio Tinto, if it retains its independence, experience its first major earnings reverse in years, although the Group may hope its recent massive acquisition of Alcan will provide support for its earnings when the going gets tougher.

Chart 3.9 Rio Tinto earnings volatility



Source: Datastream

Table 3.3 Rio Tinto earnings volatility (underlying figures)

Year	EPS (%)	Year	EPS (%)	Year	EPS (%)	Year	EPS (%)
1970	10	1980	4	1990	-18	2000	17
1971	-30	1981	-34	1991	-39	2001	-7
1972	57	1982	-2	1992	20	2002	8
1973	137	1983	50	1993	42	2003	-10
1974	-11	1984	15	1994	59	2004	65
1975	-44	1985	22	1995	8	2005	120
1976	107	1986	-5	1996	-15	2006	52
1977	1	1987	14	1997	11	2007	2
1978	19	1988	50	1998	-10		
1979	52	1989	25	1999	19		

Source: *Financial Times* – RTZ annual results

Becoming core holdings

The importance of stable earnings to the UK mining finance houses relates to their prominent position in the FTSE100 which puts them on the buying lists of index tracking funds and the major UK institutions. Whilst market value will obviously change over time, when the FT Global 500 list was compiled at the beginning of June 2008, BHP Billiton was the 5th largest UK company, Rio Tinto the 6th, Anglo American the 8th and Xstrata the 10th. I have used the slightly clumsy route of identifying their position in the Global Index rather than the UK 500 Index in order to include the Australian interest in BHP and Rio which gives us a better feel for how large these companies now are.

These stocks are no longer just a conservative way to play the commodities cycle, they are core holdings for portfolios which have no particular remit to invest in the mining sector. This means that market capitalisation, which is often a function of earnings trends, could be critical to demand for mining finance shares in the FTSE100. The greater the market value, therefore, the greater weight a mining finance share will likely have in portfolios, particularly in tracker funds. If mining house earnings are too volatile, share prices, and of course market capitalisation, will probably reflect that, a trend which will be further exacerbated by tracker activity.

The role of mining houses in portfolios

This is a recent consideration, driven partly by the development of tracker funds and partly by the growing importance of mining houses in the FTSE100. The consequence though is to throw some doubt on whether investors looking for leverage to an upswing in metal prices should buy mining houses in preference to more focused individual mining companies. One consideration to be borne in mind, now that the UK mining houses have become major FTSE100 components, is that it is likely that UK investors will have indirect exposure to the sector already, in part due to these stocks being in pension funds, life funds and general managed UK PEPs and ISAs. There is also the problem that in pursuit of reduced earnings volatility some groups may want to try and hedge their more volatile earnings sources.

There is no question that the big mining houses are well run organisations, and in a notoriously, and excitingly, cyclical sector like mining the relative stability of their earnings is not to be ignored. Also there is often good price volatility providing opportunities to achieve good trading returns for the nimble investor. Over the last ten years Rio Tinto has recorded yearly share price volatility of over 50% on seven occasions, and never less than 30%, measured on a year low to year high basis, although the share price trend may have been a falling one rather than a rising one in some of the years. Nonetheless this demonstrates good price action in the shares.

Medium sized miners

The medium sized category of mining companies, which it can be argued would cover companies with a market capitalisation of between £250 million and £1.5 billion, contains both single metal companies and diversified groups. This sector has been squeezed in recent years by the rise of the predominantly UK houses, as they have acquired some of their smaller brethren. Returning briefly to the big houses, it is worth just looking at the listed companies they have acquired or merged with in recent years, in so doing removing from public listing some interesting companies with good metal price leverage.

Table 3.4 M&A in the mining sector

Company today	Swallowed up companies
Anglo American	Amcoal, De Beers, Kumba
BHP Billiton	BHP, DiaMet, WMC
Rio Tinto	CRA, Peko, North, Ashton Mining, Ivanhoe (part owned), Alcan
Xstrata	MIM, Falconbridge

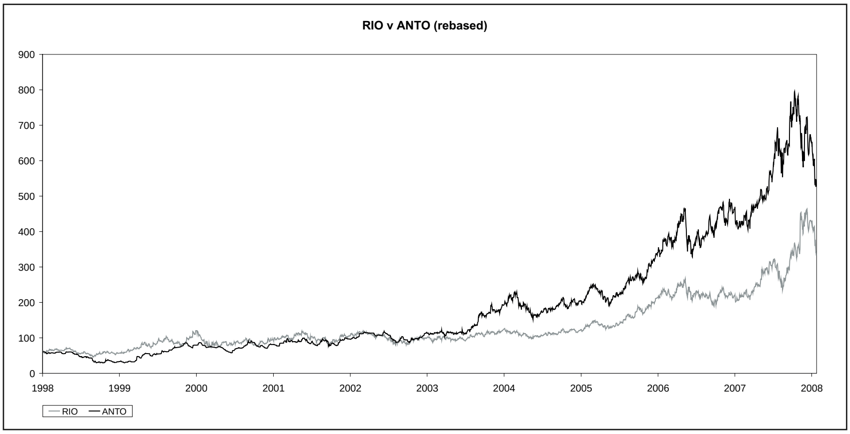
Defining a medium sized mining company is somewhat subjective and looking at the list of lost stocks above neither De Beers, BHP or CRA could be considered medium sized, their disappearance merely underlining the fact that the big are simply getting bigger.

This desire to get bigger is also influenced by the size of new mining projects today and the need to get them financed effectively. Clearly the bigger the balance sheet the more comfortable the banks will be when assessing how a new mine is to be financed. However, medium sized companies are often interesting as investment propositions because new projects can have a substantial and positive effect on earnings, and financing may not be a problem if the project is robust and the mining company in question is soundly structured.

More focus can result in out performance of the larger mining houses

For the investor, the medium sized mining company may also offer returns, even if the metal price scene is quiet, as a result of having new, high margin and expanding mines under development, and where a metal price rise would be icing on an already fairly rich cake. An example of this would be UK incorporated miner Antofagasta ('Fags') whose Chilean copper operations have grown enormously over recent years with a consequently positive impact on its share price, particularly the period up to 2003 when the copper price was flat. In the table opposite we can see the respective share prices of Fags and Rio Tinto at the calendar year end starting at the end of 2000, when Fags' copper mining expansion was having a major impact on market perceptions of the group. The out performance of the more focused Antofagasta up to 2006 is clearly seen when over that period Fags appreciated by 476% and Rio Tinto by 131%. The recent bid for Rio Tinto from BHP Billiton, however, led to a massive catch up performance by Rio in the last couple of months of 2007, but still left Fags the better performer over the whole period. Capitalised at almost £7 billion, Antofagasta is also larger than the more diversified Vedanta and is a FTSE100 constituent standing around halfway down the Index by market value.

Chart 3.10 Relative price performance of Rio Tinto [RIO] and Antofagasta [ANTO]



Source: Datastream

Table 3.5 Relative price performance of Antofagasta and Rio Tinto (underlying figures)

	2000	2001	2002	2003	2004	2005	2006	2007
Antofagasta	442	530 +20%	618 +17%	1060 +72%	1116 +5%	1853 +66%	2547 +37%	2924 +15%
Rio Tinto	1178	1314 +21%	-1220 7%	1556 +28%	-1530 2%	2926 +91%	-2718 7%	5895 +117%

The steady disappearance of the serious medium sized miner, as said earlier, often occurs because a bigger group wants to increase its product range and thus the diversification of its earnings. This inevitably leads on to a loss of focus, and in the case of the Xstrata/MIM and Xstrata/Falconbridge mergers, the loss of focus has cut both ways as Xstrata has surrendered its total coal focus and MIM and Falconbridge have surrendered their perceived position as classic plays on spot base metal prices. The side issue of nationalism, not quite dead in this age of globalisation, which led to some Australian shareholders of MIM voicing disquiet about the effective loss of another mining company to the UK, did not spark any action with regard to a competing bid for MIM in the board rooms of the shrinking group of Australian medium sized miners such as WMC Resources (the old Western Mining). Fairly rapidly after Xstrata's MIM acquisition, WMC itself fell to BHP Billiton after a contested bid with Xstrata which had been seeking to accelerate its growth.

In its own right WMC is an interesting example of the problems that some almost (but not quite) large mining companies experience. At one stage in the 90s, WMC was one of the most diversified of the Australian mining groups, with base metals including nickel and copper, gold, oil, uranium, fertilisers, and alumina amongst its interests. It then exited from gold and oil and de-merged its alumina interests; its remaining major new development was an industrial minerals project in Mozambique, taking it into Africa where Australian investors in the past have shown little appetite. Its lack of ambition with regard to MIM and its position in base metals and uranium sealed its fate.

A medium sized mining company then could be said to be in one of three key stages of development.

1. It could be growing fast on the back of one or more projects which might appeal to investors wanting exposure to a possible future giant, but one that currently combines growth with relative security.
2. It could be a mature company but with high quality operations that one of the giant miners might be interested in.
3. It could be a mature group whose interests may be a little too small, or old, to attract a bid from a major. Equally a merger with a like-positioned miner might be possible, even though it is probable that a merger of equals would not generate a market premium for shareholders.

A possible attraction of the, perhaps, slightly faded third category company is that its earnings, coming from older operations, might be quite leveraged to metal price movements which would increase its market standing during a period of rising metal prices. One might, perhaps unkindly, point to the South African precious metals stocks Harmony, Northam and even Gold Fields as being examples of companies around which rumours occasionally swirl but where no one quite has the enthusiasm to strike.

So with medium sized miners we can, if we are lucky, find growth companies, takeover targets and focused and leveraged plays, and the last three years have underlined that. We can have some security in addition, certainly in the first category, and we may well find good dividend prospects in the third category from time to time. However, we cannot just leave these holdings to their own devices, as could possibly be done with the giant diversified houses, they will need to be managed which probably means traded. It is, therefore, important to stay on top of the fundamentals to avoid suffering sudden and sharp declines in share prices, these stocks in many cases being very sensitive to changes in the metal price environment. They may also be subject to strategic change which may also have a bearing on how the investor views them.

Case study: Avmin

Management within these medium sized groups striving for the big league is also very critical. Errors in strategy will be magnified and uncertain management objectives can confuse shareholders, with a detrimental effect on both short and long-term prospects for the share price. One of the smaller South African mining houses, Anglovaal Mining (Avmin), which became African Rainbow Minerals, a black empowerment company after divesting itself of its gold interests, is a case in point.

In the heyday of the South African mining sector in the 70s, when gold was the big story, Avmin's predecessor, Anglovaal, was a broad based mining orientated conglomerate not unlike, although rather smaller than, Anglo American. The group was dominated by two families, the Hersovs and the Menells, the former loosely looked after the group's industrial interests and the latter were responsible for the mining interests. With the end of apartheid, as we already know, there followed a major restructuring of the South African mining industry, which in part concentrated ownership into bigger groupings for the purpose of competing more effectively as global entities. In the case of Anglovaal the group decided in 1998 to split itself into separate mining and industrial companies with the Menells taking on the running of the dedicated mining group named Anglovaal Mining.

Anglovaal's strategy, therefore, was to increase the focus of the old group's interests, the industrial side having been big enough to deter investors looking for mining market exposure. However, in its position as a mining company, Avmin was on the small side, definitely no more than a medium sized company, although it had diversified holdings encompassing gold, diamonds, nickel, copper, chrome and manganese – all of which had growth possibilities. So in order to increase the focus of the old group, a medium sized mining group with growth assets was brought into being. Initially it linked its longer term growth hopes with a progressive dividend policy, creating a vehicle which looked rather attractive as an investment opportunity.

Two bites of the cherry

Born into a difficult mining market at the end of 1998, Avmin's share price disappointed to begin with, but in due course staged a spirited recovery which culminated in mid 1999 with De Beers announcing that it had acquired a 22% stake in the company. Those who had picked up Avmin early for its interesting mix of assets were clearly looking clever, confirming that undervalued medium sized miners gave investors two bites of the cherry – either the broad market would eventually acknowledge the shares' attractions or a bigger player would; both would lead to a sharp advance in the share price in due course.

De Beers piles on the pressure

The original Anglovaal asset split had been accompanied by a promise that the Menell family, whilst maintaining a share structure which gave them effective control of Avmin until 2001, nonetheless were committed to an eventual capital restructuring that would lead to them ceding control. With De Beers on the prowl and clearly interested in Avmin's half share in the rich Venetia diamond mine, where De Beers had the other half, the chances of a bid for Avmin could not be ruled out even taking account of the family control issue. Early in 2000, Avmin agreed to sell its Venetia stake to De Beers and De Beers agreed to sell its Avmin shares to a group of institutional investors. The proceeds from the Venetia sale were substantially distributed to Avmin shareholders via a return of capital. However, the resulting Avmin looked rather different from its original structure, shorn as it had been of its diamond earnings which were large and an important component of the company's progressive dividend payment policy.

Avmin, however, was confident that its new projects would in due course more than make up for the loss of Venetia, and much store was put on the cash generating abilities of the Chambishi cobalt development in Zambia, which was referred to earlier on in the book. In the meantime a more conservative dividend policy was to be followed. The Target gold mine, developed by Avmin's subsidiary Avgold, promised further medium term earnings growth. In the event the group was overly optimistic about its Zambian investment and at some expense was forced to withdraw from it.

Then Anglo buys a stake

Before that, the Menell family entered into a new arrangement over the structure of the group which meant that the release of family control was less open-hearted than had originally been expected. If shareholders and the market were beginning to become confused by Avmin's strategy, the acquisition in 2002 of a near 35% stake in the company by Anglo American only added to this confusion. Especially as Avmin had specifically stated earlier, as part of the Venetia deal, that De Beers' stake in Avmin could not be sold to Anglo. Also, with Anglo now on Avmin's board it looked as though the Menell family had changed their minds on the issue of control once more and reverted to loosening their grip on the group.

Elsewhere the obvious reason for Anglo's interest in Avmin, the Target gold mine, a growing operation with significant long-term expansion prospects, held out little prospect of providing cash to the centre in the short term. Needing to fund the cost of the withdrawal from Chambishi, Avmin sold down its Avgold holding from around 60% to around 42%.

And finally, almost, the curtain

In a final twist Anglo, seeing their effective stake in Avgold and therefore Target much reduced, decided to sell their Avmin stake to Harmony and ARMgold in May 2003. Following this the new owners launched a full bid for Avgold.

The, at times, frenetic corporate and operational activity at Avmin had certainly provided the nimble investor with plenty of opportunities to trade the shares profitably since the Anglovaal restructuring in 1998. Having said that some of the corporate activity was contradictory, particularly the question of control which had the Anglo group, in the shape of both De Beers and Anglo American itself, in and out of the shares three times. The new owners threw up the prospect of yet another twist to the tale. Clearly being an Avmin shareholder was rarely dull, but it was confusing in terms of the overall strategy and this is not conducive to maximising share price returns. Also, I would argue that the loss of the diamond income flow boxed Avmin in, particularly when the Zambian cobalt project went wrong. Although shareholders got a return of capital from the sale of Venetia they also ended up with a weaker company. The chrome/manganese side did very well, but these metals do not send the pulse racing, and the Target gold project, a long term winner, went to a bigger player in the shape of Harmony.

The lessons learnt from Avmin

Avmin is an instructive example of the attractions and weaknesses inherent in investing in medium sized mining companies, where mistakes in strategy, if not fatal, can nonetheless undermine a promising situation. These errors are far more difficult to hide in a company worth under £1 billion like Avmin, than a £44 billion company like Anglo American. However, if Avmin had been able to fire on all cylinders, the spread of its mining activities and the leverage afforded by the growth prospects of most of them would have potentially provided the sort of out performance that theoretically the medium sized miner should be able to offer over its much bigger peers.

The smaller mining companies

The old adage that nothing in this life is for free is something that the investor drawn to the smaller mining company sector is trying to overturn. Mostly he fails to achieve his aim of turning a sow's ear into a silk purse, but there are sufficient successes over the years to keep hopes alive and bring back the speculator to the small company sector when the natural resources cycle starts to turn up again. A little further on we will look at a few examples of this.

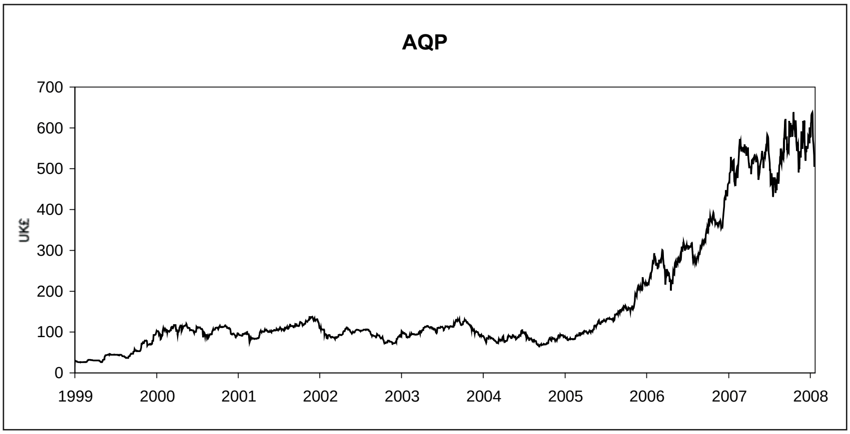
One of the continuing aspects of stockmarket investment is that when a sector becomes hot, it is quite easy to raise new money for new small participants, and the late 90s high-tech boom which culminated in the internet bubble is a case in point. One example in mining of this sort of thing was the boomlet in small Canadian gold stocks exploring in developing countries in the mid 90s, led by the infamous Bre-X and included stocks like Carterway and Timbuktu. Rather more typical was the Canadian diamond boom which was built on the very real discoveries made in the North West Territories and which unleashed a wave of well supported new issues. This boom lasted for over two years before it ran out of steam, and investors, particularly those who came late to the party, retired to lick their wounds. More recently we have been seeing a major surge in uranium stocks based on a soaring mineral price and a belief that the future once more belongs to nuclear power. Few new discoveries have been made, they don't need to be with so many identified ore resources around from previous booms, but so far lots of money has been made from the repackaging of these assets.

If prospective investors are prepared to be more realistic about what they are trying to achieve in the small mining sector, it is possible to find and follow very decent stocks that do deliver over the longer term. These are often companies with potentially viable projects at a very early stage of exploration/development which require financing and patience on the part of long-sighted investors.

A good example – Aquarius Platinum

A good example of the genre is Aquarius Platinum, a once Australian company which arrived in London in 1999 with a platinum mine in South Africa being developed on the back of the new government *use it or lose it* policy in that country. Australian investors had shown only limited interest in the company, and as it needed serious development capital it made the decision to seek a listing in London on AIM, which it converted to a full listing on the London Stock Exchange in 2003, and eventually re-incorporated itself in Bermuda. It has also done deals which have brought new assets into the company and made Impala Platinum a major shareholder, and it also has a joint venture with Amplats.

Chart 3.11 Aquarius Platinum [AQP]



Source: Datastream

From a minnow capitalised at £19 million when it listed on AIM in 1999, Aquarius has made the sort of progress that small mining company enthusiasts dream about, and now has a market value of £2.2 billion. However, it is important to remember that Aquarius's march to the edge of the large sized miner category has been as a result of hard work and probably a bit of luck. Investors prepared to put in the research time to identify these kinds of opportunities could well find winners, especially if they are patient.

Those looking for the kind of dramatic returns that can be made in boom conditions will not only have to wait for such a boom to turn up, but they will have to hope that they will be lucky enough to pick out a winner from a pack of often look-alike chancers. In a fully fledged boom like the Canadian diamond boom or the famous, and much earlier, Aussie nickel boom you do not have to be quite so discriminating in your choice of speculative vehicle, but you do have to remember to take profits. In the end if a speculative small/junior mining company does not find a viable deposit to mine, its share price will more than likely collapse.

The rate of attrition in the small company sector is also high, for without an economic discovery a company will have to keep coming back to its shareholders, or to the market, for funds to keep going. This is not difficult to do when mining markets are strong as long as the company’s story is compelling enough, but when markets are weak doors tend to clang shut and speculative capital dries up. However, despite the failure rate a surprising number of small companies manage to limp on through the hard times and live to fight again when resource markets swing back into favour.

Getting the minerals out requires different skills from finding them

However, if finding an economic mineral deposit is difficult enough, and achieved by only a small number of hopefuls, turning the deposit into a mine is hardly easy either. One of the problems that smaller companies face is that the management skills required to achieve the metamorphosis from exploration hopeful to mining company are not the same skills as are required to keep a company going during the speculative exploration phase. The approach, perhaps somewhat promotional, that has been highly successful in raising small amounts of equity finance may be quite inappropriate for raising the much larger financing required to bring a mine to production. Many mining entrepreneurs find it hard to relate to the banking industry to which they must go for the mine development money, and bankers, once sure a mine is viable, want to talk to someone who understands the economics of the project rather than just the geology and the engineering.

Small companies are less able to cope with disaster

Another related issue that has to be faced when looking at small mining companies is their robustness. The giants and even the medium sized company may have to deal with a disaster whose scale would probably overwhelm a smaller mine owner. The flooding at Mufulira on the Zambian Copperbelt in 1970/1, and the flooding at West Driefontein on South Africa's West Rand in 1968, were two such events. The expertise and financial strength that, in the case of Mufulira, the Amax managed RCM and, in the case of West Dries, controlling finance house Consolidated Gold Fields, were able to bring to bear on these two near catastrophes was critical to saving the mines. The well regarded UK gold explorer, Navan Mining, collapsed in 2003 after expanding its interests away from its very promising Bulgarian gold leases into zinc mines in Spain. When the zinc price crashed, Navan's operating losses and its highly indebted balance sheet sunk it, even after a rescue equity financing. In the mid 90s Australian junior gold miner, Mount Burgess, was only saved from disaster when it lost the orebody at its Butchers Well mine in Western Australia, by using its highly prospective Red October gold deposit as bait for a rescue joint venture with Sons of Gwalia. Though Mount Burgess survived, shareholders, who bought before Butchers Well got into trouble, will be lucky ever again to see the price they paid at the time. More recently we have had the Cigar Lake flood which has put back the development of Canadian uranium giant Cameco's new high grade uranium mine by several years, and in the process helped fire the current uranium boom. Cameco's size and financial resources have ensured its ability, despite the pain, to overcome the Cigar Lake disaster.

An eternal problem – financing the stage from dream to reality

The financing of small mining companies is never straightforward, although because hope springs eternal small scale equity finance, particularly when mining shares are in a bull market, is often readily on offer through stockbrokers with a mining specialisation. It can be costly, but high-risk capital seldom comes cheap unless it is raised at the peak of a boom. The real problems for a small company start when it begins to look for longer term project development capital. At this point shareholders in a successful small miner need to pay very close attention to the cost of this later stage capital. If they have taken on significant risk to steer a prospect through the inevitably uncertain early phases of exploration and development, they do not want to cede too much equity at the point when the dream begins to become a reality.

This then is the eternal problem for those few small mining companies that find an economic mineral deposit – *how to develop it without giving too much away.*

One solution – joint ventures

One of the most common, and obvious, ways to develop a new mine is to seek a joint venture with a bigger group (not necessarily one of the giants though). The problem with this approach is that if the prospective mine is likely to be a large producer of whatever metal, the market in the initial stages of exploration will have probably bid the small explorer's shares up to extremely elevated heights following the discovery and the first few *exciting* development/drilling reports. This was certainly the case with the great Aussie nickel boomer Poseidon in 1969/70, of which more later. That old investment adage – *it is better to travel than arrive* – holds a lot of weight in the circumstances of the exploration part of a fully fledged mining boom. The current mining boom so far has been led by the big stocks and their corporate ambitions so exploration successes have had less impact, but there is no reason to believe that old adages that have driven past booms will not come into their own later on as the cycle matures.

Sometimes, if a company joint ventures at an early enough stage, the share price may actually be boosted by the new partner. That was certainly the case with DiaMet during the mid 90s Canadian diamond boom, which took on giant BHP to carry the expensive Arctic drilling programme required to prove up what has become the Ekati diamond mine.

Sometimes the market has more information on a project involving a small miner but still ignores pertinent facts. Such a situation can be very dangerous for the investor who, sensing an interesting opportunity, plunges in believing that the market has fully discounted any potential problems.

Zambia Copper Investments (ZCI)

A good example of this trap would be Zambia Copper Investments (ZCI) in the late 90s, then an Anglo American subsidiary and the Konkola copper participation. When Anglo finally won the privatisation bid for the Konkola mine and deep level project in 1999, it assigned its interest to ZCI. At that stage the market capitalisation of ZCI was around £90 million with a net worth of just $30 million, and the Konkola Deep project had a development cost of more than $750 million with ZCI having an 80% stake in it. When in 1997 Anglo had had its original bid to buy Konkola conditionally accepted, and then temporarily trumped by Anglovaal, its stake was to be 40%, and with interest high in Zambian privatisation at the time, ZCI's market capitalisation was a heady £250 million (against its modest net worth).

Clearly on the basis of these valuations, 1997 or 1999, the market was paying little attention to the fact that ZCI would have to engage in a huge fund raising to follow its interest in Konkola, the effects of which would have been a huge dilution of the then current shareholders' stake in the company. Indeed at the end of 2001, when the Konkola project was still live and Anglo American had leant ZCI $190 million with interest to be rolled up into the loan, ZCI's debt/equity gearing ratio was a massive 1,250%. Before any long-term bank development finance could have been raised for the project the potential lenders would have insisted on a major recapitalising of ZCI. Of course when the shares were standing at 200p in 1997 the market was expecting that Anglo would make ZCI its African mineral vehicle using Zambia as its starting point, or takeover the company at a massive premium to its net worth. Neither happened and now ZCI is no longer part of the Anglo stable and its market worth at 7p in mid 2003 had fallen to a mere £9 million.

Perhaps the complexity of the above serves as a reason for investors to concentrate on the big diversified miners with their powerful balance sheets and healthy profitability, and eschew the risks endemic in many smaller mining companies. It would be wrong, however, to leave the subject of ZCI without pointing out that since Zambia abandoned the centrally planned economy in the early 90s, the share price of ZCI has moved in wide bands providing a number of opportunities for very profitable trading. Indeed between 2003 and 2007, ZCI staged another remarkable recovery as the Konkola story came back on the boil following Vedanta's acquisition of a control stake in the project after Anglo's exit. The shares, now primarily traded in Paris, reached €2.80 (194p) in mid 2007, and then again later in the year before collapsing to €0.91 in early 2008 in the wake of a disappointingly low valuation of ZCI's 28.4% stake in Konkola. This sort of volatile price performance is also a feature of the other Zambian copper play, ZCCM Investment Holdings.

Below is shown the cyclical price performance of ZCI in UK sterling since 1972. As can be seen the low to high gains are very large and usually accomplished in a very short time with intervening weak/flat periods which are long or very long. The trading tactic would be to buy at 30p and then buy more if the stock goes below 10p. Selling is less easy but starting at 50p and then scaling down the holding as the price rises would secure good profits. By the way, ZCI unusually has had the same number of shares in issue throughout the 35 years of activity shown.

Table 3.6 Price performance of ZCI

Low year	Price (p)	High year	Price (p)	% gain
1972	28	1973	80	186
1979	9	1980	54	500
1987	7	1989	38	443
1991	15	1993	84	460
1996	30	1997	205	583
2003	7	2007	194	2671

Playing the small mining sector can be dangerous for your health, but as with all stock market investment, those who know what they are doing can make a lot of money, particularly if they are not too greedy.

The days of equity financing have passed

We have touched on the issue of financing of potential new mines owned by smaller companies. The days when South African gold mines, for example, were financed entirely by equity (still common in the early 70s) have passed, and banks, through their specialist corporate finance departments, now regularly seek to provide the required finance. Most mines these days are financed on a non-recourse basis, which means that if, for example, the mine becomes uneconomic before the loans are repaid there is no recourse to the developing company for the balance of the loan. One exception was Griffin Mining, AIM listed, with a zinc mine in China which was financed entirely with equity. In the case of new gold mines the lenders will probably insist that protection is taken out by selling gold forward or through some other derivative structure that will protect the mine's revenue stream whatever the gold price does. This is less easy to achieve with other metals where forward selling is only available for a short period.

Small scale finance is of little interest to the big banks which look to get involved in big projects where big fees can be charged to pay for those banks' big overheads. Big projects these days probably mean that the small discovering company has brought in a substantial partner, so the project financing process should be relatively straightforward with the relevant bank likely to know and be comfortable with the larger mining group involved. It is difficult today to conceive of a mining junior being able to take a large project right through to production from discovery without the help of a bigger entity, so daunting are the financing issues and the associated banking due diligence requirements. Underlining this, in the South African platinum sector in the last couple of years we have seen Southern Platinum and AfriOre being taken over by Lonmin, and African Platinum being acquired by Impala.

Mining company life cycle

It would perhaps be useful at this stage to look at a virtual life cycle for a mining company to provide some guidance to investors wondering where a company that interested them might have got to in its development.

The growth of a typical mining company

Early stage – private company…

In its very early days the company would probably be private, financed by a small number of linked investors as a result of the acquisition of promising mineral properties by the founder shareholders. The now AIM listed ZincOx Resources is one example, Witwatersrand Gold now listed in Johannesburg but originally financed in London is another. These properties might be already known, either as promising prospects like Aquarius Platinum's original South African leases or as old mines now closed. There are plenty of examples of the latter – Australia's beleaguered Sons of Gwalia, for example, built its gold operations around the old Sons of Gwalia gold mine in Western Australia. The company might also be looking for minerals in a greenfield environment, as Poseidon did in Western Australia during the 60s Aussie mining boom.

…leading on to further financings, and then a stock market listing…

At an early stage, if the market environment is right and the company's projects are considered promising, an unlisted company would probably seek further finance and a stock market listing to increase the shareholder base and crystallise value for the original shareholders.

…concentrate on the most promising mineral leases…

At this stage it would then prioritise its projects and concentrate its new resources on exploring and drilling its most promising mineral leases. If it was looking at a known mineralised area it would have more obvious drill targets and be able to work in a more focussed manner and more quickly. The next stage would be either the starting of detailed work if the deposit looked economically viable or the abandonment of the project as uninteresting or uneconomic.

…bankable feasibility study, leading to development finance…

If the detailed work indicated a potential mine then a bankable feasibility study would be undertaken, with the aim of seeking development finance from the banks. It is also quite possible that the company would seek joint venture development of the project with a bigger mining company who would be better able to secure development finance. Such a course was taken by Randgold Resources over the development of its Morila gold mine in Mali, where AngloGold acquired a stake. It is also quite likely that our small mining company might have joint ventured the project earlier during the exploration stage. Indeed, the company could be taken over at this stage as happened to Reunion Mining when Anglo American launched a bid to get control of the Skorpion zinc project in Namibia.

…through the development stage to receiving a cash flow from the mine…

We will now fast forward to the point where our steadily growing mining company has brought its project through the development stage and is now receiving cash flow from the mine. It is consequently much less of a speculation and more of a serious, if still probably quite small, mineral producer. It has cash which it can use in a number of ways. It can start to pay its shareholders a dividend but it will probably want to conserve some of its cash to pursue other exploration programmes. It could delay dividend payments so that it had the use of all its earnings to follow an aggressive growth strategy, both in terms of exploration but also corporately, where it could itself become a financing joint venturer or even a takeover predator.

…choice of cash cow or capital investment in further exploration...

At this stage our virtual mining company has arrived at a crossroads. It can become simply a cash cow for its shareholders through the dividend route, spending a little on exploration in the hope that it will discover another economic deposit. If it took this route it would not be impossible that it could be taken over by a larger group attracted by both the mine and the exploration areas. It is unlikely that the company, at this stage of its life, has the option of doing nothing; a luxury enjoyed by many mining companies in the distant past when corporate activity was the exception rather than the norm. So it is unlikely that our company will stand still, it will either grow or disappear into a bigger group, two outcomes that would benefit the shareholders in due course. There is one exception to this which is a growing company where there is one shareholder with a large enough interest to block any unwelcome approaches. In mining Antofagasta would be an example of this, as it was able to bring its copper projects in Chile to fruition, lifting it from market minnow to the Footsie, without fear of an approach because of the control exercised by the Luksic family.

…to stay independent, the company must move quickly…

Having chosen to stay independent our virtual company then probably has to move fairly quickly to secure its position before it becomes a corporate target. It is important to realise these days that there seems to be no limit to the size or structure of mining companies that may get taken over, although the medium sized companies like MIM, Avmin and Ashanti have been the initial targets. The reason for this is probably that they were too small to resist a takeover but large enough to have a significant effect on the predator’s figures. More recently the predators’ appetites have increased and we have seen the disappearance of WMC Resources, Inco and Falconbridge. We have also seen giant mergers such as Anglo/De Beers and BHP/Billiton, although in the latter case we had a merger of equals rather than, as with the former, a cash takeover at a premium. Now with Rio Tinto’s acquisition of Alcan the takeover exercise has stepped up to another level and the BHP/Rio battle may take us further, although Rio is resisting strongly.

Interestingly we have not seen any cash rich oil company come forward, as they did in the 80s, preaching the concept of an integrated global natural resource giant.

Few companies now graduate from explorer to diversified giant

Investors have to be realistic about the chances of getting in right at the start of a mining company's rise from explorer to diversified giant. Almost all the world's leading mining groups have been around as important companies for several decades. They have, of course, grown to a substantial size over the period, but there are very few around today who will remember them as hopeful juniors. Barrick Gold may be an exception, although some would argue that its strategy of growth by merger and acquisition hardly puts it into the category of a junior explorer that made the big time. Looking around today's mining markets, there are a number of smaller companies that have moved beyond the junior stage having developed a mine and started to flex their muscles both corporately and operationally. Amongst these companies would be Randgold Resources, First Quantum, Aquarius Platinum, and Antofagasta. Whether any one of these will make it to giant status in due course is another matter but Fags has achieved a position around the middle of the FTSE100.

It is understandable, if a trifle optimistic, for investors to hope that they might be lucky enough to chance upon a future mining giant in the very early stages of its life. If one or two do they will be lucky indeed, but investors have the consolation of knowing that there are many opportunities to follow a junior out of the lower reaches of the sector onto a somewhat larger, if not giant, stage and make very good money in the process.

Managed investment vehicles

For those investors who find making choices in the mining market difficult, there are always managed funds to be considered. This is a very fluid area where the available choice is not quite what it used to be due to the lack of popularity of the mining sector until quite recently. In the 70s and 80s there were a considerable number of specialist mining/natural resource funds in London, but over the years these have tended to either be amalgamated with other similar funds or disappear completely. The funds are usually listed and take the form of open ended funds such as unit trusts or mutual funds, and closed end funds like investment trusts. Managed mining funds can also be found in a number of countries apart from the UK, including the US, South Africa and Switzerland. Mining funds in the US are likely to be aimed at investors interested in gold mining, whilst mining funds in the UK are mainly generalist in shape.

Fund managers vary in their knowledge of the sector

Although managed mining funds allow the investor to leave the choice of mining company, big or small, to a professional fund manager, it is often a value judgement as to whether the fund manager, whose expenses the investor is paying for through the annual management charge, actually has superior specialist knowledge of the sector. A number of funds do have very experienced specialists running or advising the funds, others use knowledgeable but not particularly specialist managers who have other non-mining responsibilities. These latter generalists may actually have a good grasp of the sector and a good track record, but are unlikely to be able to give the sector the sort of attention that is critical if their stock picking is going to include high risk/high reward situations.

There is also the issue of company access and specialist broker support. The specialist mining fund managers probably are on the early call lists of the most interesting smaller companies, and would also tend to see the best investment propositions from the specialist mining broking fraternity. It may be that the more generalist managers are not so well served in this area, or if they are their judgement may be less reliable due to their non specialisation.

Since this area is a very fluid one I am neither naming names or dropping hints about whom we are talking, but if investors are planning to use a managed fund for mining sector exposure some research will be necessary or they may end up no better off than if they had used a pin. The following table shows some of the mining funds available in the UK.

Table 3.7 Mining funds in the UK

Fund Name	Fund manager	Fund type
Merrill Lynch World Mining	Black Rock	Investment trust
City Natural Resources High Yield	New City	Investment trust
Geiger Counter	New City	Investment Trust
Resources Investment Trust	Newland Resources	Investment Trust
CF Ruffer Baker Steel Gold	Ruffer	Unit trust/OEIC
Merrill Lynch Gold & General	Black Rock	Unit trust/OEIC
JPM Natural Resources A	JP Morgan	Unit trust/OEIC
Baring Global Resources	Baring Asset Management	Offshore fund (open ended)
Global Resources Fund	First State Investments	Unit trust/OEIC
Investec Global Gold	Investec Asset Management	Unit trust/OEIC
Nucleus Global Gold	Smith & Williamson	Unit trust/OEIC

I have talked about the big Footsie mining companies like Rio Tinto before and the spread of interests they have across the metals sector. The funds above manage their money in a variety of ways – World Mining Trust has a huge balanced portfolio with a large exposure to big stocks as well as smaller miners, City Natural Resources concentrates entirely on the smaller end of the sector.

I have excluded from the list funds where there are high minimum investment commitments or other kinds of restrictions – Baker Steel for instance run three natural resource funds under the Genus brand which are restricted to so-called professional investors; many other funds do the same. I have also not included the large number of non-UK managed resources funds either. Also, it ought not to be forgotten that the funds scene is changing all the time and new resource funds are being established on a regular basis.

Looking at 2007, below I show the relative performance of the World Mining and CNR investment trusts (plus Resources Investment Trust) against the Footsie big three.

Table 3.8 2007 price performance comparison of funds and mining stocks

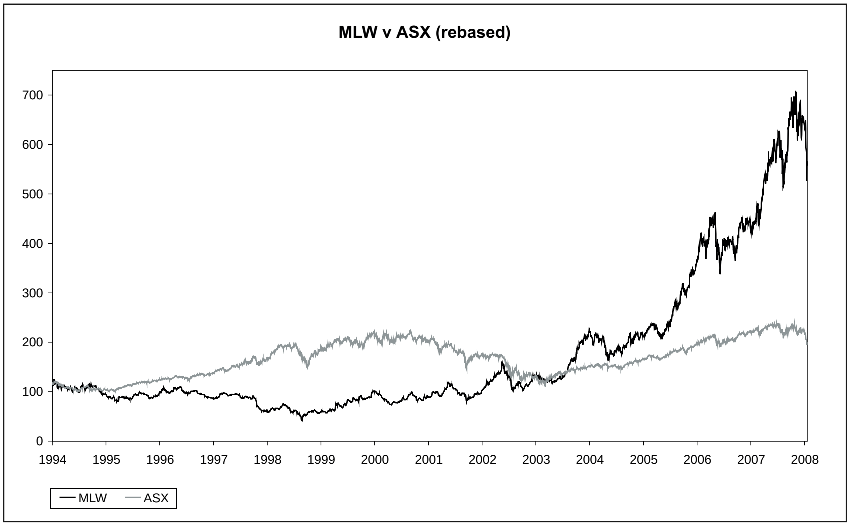
	2007 high	2007 low	% change
World Mining Trust	723	419	+73
City Natural Resources	208	137	+52
Resources Investment Trust	313	215	+46
Anglo American	3681	2372	+55
BHP Billiton	1898	877	+116
Rio Tinto	5930	2502	+137

Source: FT Main Market prices

It is by no means clear from the above figures, although they cover a relatively short period, that active mining fund management adds significant value against simply investing in the mining sector's leaders. However, the leaders, despite their size are more focused than the investment trusts, and their spread of interests, whilst considerable, expectedly does not have the eclectic range of, say, World Mining Trust.

The final point that should be made is that using a managed fund does at least mean that a less confident investor will get the company spread that he may not be able to achieve for himself either because of lack of resources or lack of knowledge.

Chart 3.12 Merrill Lynch World Mining Trust [MLW] v FTSE All-Share [ASX]



Source: Datastream

Stock market cycles

We have talked earlier about mining shares in relation to stock market cycles for industrial equities. I now want to look at mining share cycles over the last thirty years or so to see where they sit in terms of overall market cycles, and whether there are any pointers we can find that could be applied in the future.

The situation that any investor wants to avoid is tying too much of his money up for long periods of time in a sector which is underperforming. Having said this, I am not backtracking on my view that every portfolio should have a core of gold shares because of their counter-cyclical role when industrial shares come under pressure. In that context the gold content acts as insurance against a general equity bear market, and the gold core, when the general industrial market is in a bull phase, will in any case represent only a small percentage of the portfolio's value.

Australia, late 60s – the first modern mining boom

The first modern mining boom was that which 'infected' the Australian market in the second half of the 60s, and which eventually ran out of steam following the rise and fall of Poseidon. The bull market lasted from 1966 until 1970, and until the last year or so marched in step with strong industrial bull markets, particularly in the US, the UK and South Africa. When these markets started to collapse in 1969 the Aussie mining market, led by the nickel explorers, took over the running. So seamless was the handover that stock market strategists theorised that the whole mining share sector could be seen as counter cyclical. Thus general investors, having run with the industrial bull market, could extend their profit-making opportunities by switching into mining stocks at the appropriate moment. Those who got out of the 60s equity bull market and switched into Aussie mining shares would have hugely enhanced their capital gains, as long, of course, as they got out of their mining shares in time as well. Few did, in the UK partly because of the penal rates of tax on short-term capital gains.

Attention turns to gold with the fear of inflation in the 70s

So strong had been the 60s equity bull market that in the UK it experienced another leg in the early 70s, topping out in 1972 at a level it didn't see again for many years. At that stage, although interest in mining shares had revived, it was taking a different shape to the base metal led late 60s boom which had come about partly as a result of the Vietnam War which boosted base metal demand and prices. Attention, stimulated by fear of rising inflation, had fallen on gold, and it was South African gold shares that now took the spotlight. This emphasis was to continue, off and on, well into the 80s, pushing non-precious metal stocks into the background.

In fact gold shares had begun to run late in 1971 following the closing of the US Government's *gold window*, at which foreigners had been able to present surplus dollars for conversion into gold at the fixed price of $35 per oz, for many years. This uptrend continued, accompanied by intermittent pullbacks, until the gold price, having started at $35, touched $200 at the end of 1974. Between 1971 and 1974, South African gold shares rose 600%, although they actually peaked ahead of the gold price in the spring of 1974. From 1972 until the beginning of 1975, equity markets around the world, particularly the UK and US, were in free fall. In December of 1974, the UK market plunged to a level in inflation-adjusted terms not seen since the fall of Norway in 1940 in World War II. Gold shares had proved their worth as a hedge against general market weakness. Other non-precious metal mining shares did less well in what was a market desperately trying to hedge the effect of runaway inflation. As an example, between 1971 and 1974, RTZ (Rio Tinto Zinc) fell from 270p to 73p.

Gold enjoys another run in the late 70s with renewed fears of inflation and geopolitical problems

As industrial share markets began to recover in the mid 70s, diversified mining houses also rallied on the back of hopes that the return of economic growth would revive metal prices and their earnings. In fact the next big run in mining share markets was once more in South African gold shares after they bottomed out in mid 1976 in parallel with gold itself which, having hit $200, had halved. A further pressure on gold shares was the fear of race riots in South Africa spilling uncontrollably over into the gold mines of the Witwatersrand. By the beginning of 1979 the political situation in South Africa had calmed and with gold itself rising through $200 for the first time, gold shares began to run again. Between 1976 and the end of 1980, South African golds rose by 360% with the lion's share of the rise coming in 1979/80; gold itself rose by more than 700% over the same period. The revival of inflation and a chronically weak geopolitical situation (described earlier in the section on gold) led to a growing interest in commodities as real assets, and other non-precious metal stocks also attracted attention alongside the golds. However, whilst base metal prices strengthened, as in the mid 70s, the spotlight was primarily on gold and this spilled over into silver.

Following the topping out of gold at $850 in January 1980, gold shares fell back, but by the second half of the year another gold bull run was building up as the Iran/Iraq War threatened stability in the oil-rich Middle East. This was short-lived and the bears returned in force, so by early 1982 gold shares had fallen back to the level at which they started their last decade run in 1976. Suddenly, in barely six months South African gold shares rose by 300%. Other non-gold mining shares were also strong on the back of a sustained recovery on Wall Street supported by optimism about growth prospects for the advanced economies. After this sharp surge gold shares retraced two thirds of the rise over the following two years, bottoming out in the first half of 1985.

Gold shares soared in 1986-87 in line with broad equity markets, but…

This fall was followed by another bull run in 1986-7 with South African gold shares rising by around 200% to record levels. This happened against a background of industrial equity bull markets around the world. Consequently, the mining bull run was a broad based one and other non-gold mining companies ran strongly until the 1987 October crash in New York led to a near meltdown in global markets.

Gold shares de-coupled from the gold price, as gold shares followed the equity markets down

There was also a de-coupling of gold shares from the gold price itself which saw gold, in the wake of the October crash, piercing $500 on the upside for the first time in four years even as gold shares slumped. The gold share market continued to be very volatile even as it worked its way cyclically lower throughout the 90s. There were big runs in South African gold shares in 1989-90 and then again in 1993-4, but these were not counter-cyclical movements as equities generally were in a bull phase, albeit one with the ubiquitous *wall of worry* attached.

Gold shares recover their counter-cyclical nature in the wake of the high-tech crash

In the later 90s and early in the new millennium, industrial equity markets were very strong and this helped to sustain the share prices of the big diversifieds, with Rio Tinto for instance rising by over 180% between 1998 and 2000. During that period, gold shares wallowed, almost in despair as the gold price sunk below $300 for the first time since 1979. But as the equity bull market capitulated on the back of the collapse of high-tech stocks in 2000, gold shares came back into their counter cyclical own. Over the period from late 2000 until mid 2002, gold shares, unloved and heavily oversold by the end of the tech/internet boom, rose by as much as five times.

The supercycle rears its profitable head and investors lose their's

Over the last five years, almost completely out of the blue, a bull market – some call it a supercycle– has started in base metals and suddenly mining shares of all shapes and sizes have begun to move higher. Prices of metals such as copper and nickel, which some thought were in almost permanent oversupply, rose by over four times as investors suddenly discovered China and its appetite for raw materials. Following its early decade run gold took a back seat whilst the base metals bull trend unfolded. However, in mid decade gold did put on a spurt doubling to $730 by late spring 2006. It then fell sharply towards $500, and from late 2006 has moved steadily higher 'filling in' the earlier price surge. From there, in early 2008 the price broke through $1000 but subsequently fell back to around $900. Whilst base metal shares have benefited from a spate of mergers as well as surging earnings, gold shares have found the going tough with ageing operations and a weak US dollar acting as a restraint on profitability despite the rising metal price.

Platinum bull markets

Although above I have tended to concentrate on the bull runs in gold shares, there have been instances of strong markets in other mining groups. One example would be platinum shares, which are confined primarily to the major South African stocks. These have enjoyed strong cyclical runs over the last thirty years, sometimes in association with gold shares, but not always. Indeed, since platinum is used mainly in the car industry and in jewellery, its price often moves in line with economic growth trends, partly as a result of being a non-monetary precious metal in contrast to gold. Thus, we experienced robust growth in platinum shares in the late 90s when between 1998 and 2000, prices rose by almost four times. This run coincided with a rising equity market and a dull gold share market. More recently with industrial demand strong and with a very active corporate scene, platinum shares have outperformed gold shares once again.

Canadian diamond boom 1992-94

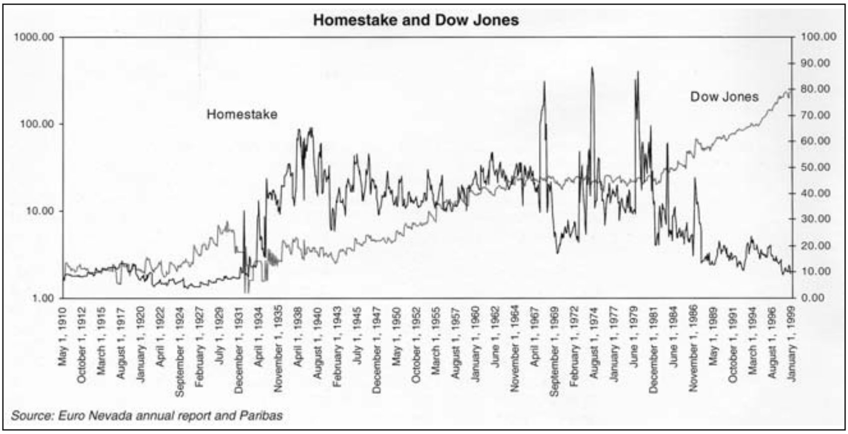
It is also important to note that mining exploration booms can have a quite separate life of their own; the Canadian diamond excitement of 1992-4, which has been mentioned before, was a case in point. The background in terms of economic growth was poor in the early 90s, and by 1992 the industry's leader, De Beers, was suffering from a sharp fall in demand for diamonds which further soured the atmosphere. That, however, did not seem to worry grassroots Canadian investors and Continental European investors who gobbled up the stream of new issues coming to market to take advantage of the diamond rush in the North West Territories. Of course, critical to this was the large BHP/DiaMet diamond discovery at Lac de Gras (now called

Ekati), and this provided the incentive for further speculation that other large discoveries might be made.

Sometimes, mining share cycles run in line with the broad market as investors conclude that economic growth will feed quickly through to demand for metals, raising production and prices. In the late 90s the UK diversified mining groups performed strongly, even as the broad stock market powered to record levels. It may be that the position of these companies within the FTSE100, arguably the third most important index globally after the Dow Jones and the Nikkei 225, is now so central that they may become less counter cyclical than might have been the case thirty years ago. Certainly, the UK mining sector has taken heart from strong metal prices and the China story, not forgetting some fairly chunky corporate activity also which has led to a rash of mergers in recent years, and it is now one of the biggest sub-sectors of the Footsie index.

Delving back into the more distant past, one of the classic examples of mining shares outperforming industrial equities was the experience of US gold shares, led by Homestake Mining, in the 30s following the Wall Street crash of 1929. The driving force behind this outperformance was due, as it was in 1974 when gold shares also outshone equities, to a complete loss of faith in the economic/financial system which drove equities through the floor and the gold price in the opposite direction. Slightly more recently, and mirroring the Canadian diamond boom and the Australian nickel boom, was the development of the Orange Free State gold field in the late 40s after the end of World War II. The substantial increase in interest and activity generated by the opening up of a major new gold field was as a result of an event unrelated to any other, and occurred during a period when equities generally were churning sideways because of post-war austerity.

Chart 3.13 Homestake v Dow Jones



Source: Datastream

Portfolio strategy

The sort of volatility which has been described above also raises the question of portfolio strategy. Until quite recently the expansion of private pension schemes and the advent of tax sheltered investment vehicles in the form of PEPs and ISAs in the UK led to a rising stream of savings coming into the market, and not dissimilar trends were also to be found in the US. Europe, too, began to pay more attention to equities as an asset class for pension funds, and optimists began to speculate that share prices perhaps had entered a new era when share market weakness would be all but banished. In such an environment the need, indeed the wisdom, of trading shares, of taking profits, could be called into question. However, the cyclical nature of metal markets, and therefore of mining shares, is unchanging even in a new paradigm for stock markets, so those who ride the cycle and take profits will end up satisfied investors. More importantly they will surely want to return when the cycle beckons again. Participating in the cycle and making and taking profits should be the investment aim, not trying to make a lifetime's fortune in one go as many have tried to do, seduced by the prospects of the great scams that sweep across the mining market from time to time.

Building a mining portfolio

Obviously there has to be a portfolio before an investor can develop a strategy to manage it, and here we need to consider how to construct such a portfolio.

To begin with, it is obvious that an investor could simply buy a group of mining giants – Rio Tinto, BHP Billiton, Anglo American, Xstrata, Newmont, Barrick, Vale (CVRD), and Alcoa – and leave it at that. He would have covered the mining waterfront but as a result he would have simply purchased a tracking portfolio. However, once an investor has caught the mining bug it is unlikely he will be satisfied with managing his risk solely through investing in big diversified miners like these. He will surely want to maximise his returns through building his own mining sector exposure, even though a couple of the big diversifieds may make sense from a portfolio balancing point of view. In doing this there are a number of issues to be considered.

The portfolio needs to be dynamic

The first thing that we need to understand is that a personal mining portfolio cannot be a static thing. It seems an obvious thing to say, but if gold is the flavour of the month then it is pointless having little exposure to that metal but for historic reasons be loaded up with, say, copper producers. On the other hand any portfolio should in part be trying to anticipate trends, so it is little good slavishly following the trend and consequently too often buying near the top. Whilst any mining portfolio needs to be actively managed, it also needs a structure.

Diversify by metal and not by country

If an investor is going to divide up his holdings into sections they should be done by metal and not by country. Doing this should lead to a better balance in the stock list. Along with the core holdings should come a group of more focused shares directed towards backing the investor's call in the metal market. In this focused group there should be a balance of producers and explorers. If nickel is strong then exposure to producers will lead to sharply rising revenues, and hopefully earnings, dividends and share prices as well. The explorers provide the hope factor that could turn a piece of desert into a mine and lead to a multiple increase in the share price. If the portfolio is metal orientated rather than country based, this will enable the investor to compare and take advantage of differential price movements between countries in a bull market. To explain, the developing gold bull market that started in late 2001 was led by the South African gold stocks with North American and Australian shares trailing in their wake. This was partly a function of a weak rand. When gold, after a breather in the middle of 2002, took off again it was not the South Africans that ran most strongly this time but the North Americans and Australians. The South Africans trailed because the rand was strengthening against other gold mining currencies, and additionally the SA government had announced their intention to accelerate the black empowerment process and also introduce mining royalty payments. More recently, interest in gold shares tailed off a little as the metal price consolidated following its strong run in 2006, and the South Africans have remained beached with rising costs the new headache despite a renewed surge in gold in late 2007. Elsewhere, gold shares have been quieter than base metal shares but the odd discovery and some corporate activity has intermittently brightened the North American and Australian sectors.

Don't be afraid of holding cash

I would also recommend that investors running personal mining portfolios should never be afraid of holding cash if they don't like the market. They are no specialist institutions running a mining fund for outside investors. In that situation the investor is expected to make the decision about being in or out of the mining market by selling the fund's units or shares, not by encouraging the manager to go liquid. The manager is expected to concentrate on getting his stock picking right within the fund. But if a directly invested mining portfolio does go very liquid the investor must not consequently lose interest in the sector. If we assume that he has booked good profits in the course of selling some of his holdings we would expect him to return to the fray in due course, emboldened by his past success and ready to use the experience gained to repeat that success.

A balanced portfolio

So I am advocating a balanced portfolio with a core of big diversified companies perhaps representing between a quarter and a third by value. These stocks will also provide a useful income flow. I would also look for mining fixed interest opportunities in the convertibles area which would further improve the income stream. Perhaps these stocks could represent a further 10% of the portfolio, but no more as they are often very illiquid. The rest of the portfolio would be divided between large metal specific mining companies (Antofagasta for copper exposure would be an example of the type of company), smaller diversifieds where there may also be takeover prospects mixed in, and smaller mining companies with growth potential and this would also include exploration companies. Because I am advocating a growth approach the emphasis in this 60% or so segment of the portfolio would be on selecting the most promising metals and then making sure that at least part of the exposure was fairly aggressive.

Riding the cycles

In the end, because of the cyclical nature of the mining market it should be possible to make money from an actively managed mining portfolio on a regular basis. Also, because of the sector's cyclicality active investors should not worry about hitting the top and the bottom of the market, except of course if you are buying at the top and selling at the bottom in which case you are only going to participate in a mining boom once. The aim should be to start securing profits relatively early, riding the market up with a diminishing number of positions, until you are left with just your core big stocks. And because of the sector's cyclical element I don't believe it hurts to return to the sector early, just as long as you retain enough liquidity to add shares as the market turns to the upside.

EFTs and other metal-related investments

There is also the question as to whether some of the new participation vehicles such as exchange traded funds (EFTs), which have been established across a wide range of metals, should be considered as possible holdings within a broad based mining portfolio. The issue is that our interest is primarily in mining shares but some investors might like to vary the mix a little by having exposure to the underlying metal price movements as well. Buying the physical metal is basically denied to many investors by the problems of trading volumes, investors would not be welcomed by metal traders if they dealt in just a few thousand dollars worth of metal. There is also the problem of storage and insurance of the metal bought.

Commodity EFTs, known as Exchange Traded Commodities (ETCs), are available in a number of countries. In the London market there are a considerable number covering the main precious and base metals, the largest group of funds is administered by ETF Securities and these same ETCs are traded on the German, French, Dutch and Italian stock exchanges. The creation, redemption and trading of these securities is done by a number of investment banks including Merrill Lynch, Société Générale and Barclays.

There are three types of ETCs – the physical, index and individual commodity funds. These funds cover both metals, energy and soft commodities but we are interested here only with the metals ETFs. The **physical funds** cover gold, silver, platinum, palladium and a basket of precious metals where the percentage allocations may alter over time. These funds actually buy and hold physical metal and prices are calculated on the basis of spot metal prices. The **index funds** cover precious metals and industrial metals and are priced on the basis of the futures price of the underlying metals. **Individual funds** are available for aluminium, copper, gold, nickel, silver and zinc; these are also valued on the basis of futures prices. The pricing for these two latter types of fund is the relevant Dow Jones AIG sub-sector index. ETCs can be bought by an investor's own stockbroker.

Options and futures

There are also traded options available for gold and silver, and futures contracts available for a wider range of metals. These instruments are both more complicated and more risky than ETCs as they have limited lives and are therefore only suitable for experienced traders, i.e. they are traded over fixed periods and have to be closed at the end of the period. With futures contracts there are also usually requirements to put up more money to maintain the position if it goes out of the money during the currency of its life. In exchange for limited life and enhanced risk an investor gets a leveraged position where he only puts up a proportion of the potential value of the contract in order to 'play'. This is difficult territory for the ordinary investor and probably should be avoided by all but the experienced investor. These are short-term trading vehicles and not, therefore, really useable for long-term investment strategies.

Company announcements

Once an investor has become involved in the mining sector he will undoubtedly be on the lookout for regular news from the companies he has invested in. Later in the book we look at the range of information available on mining companies and the sources. But before we do that it would be helpful to have a look at a results announcement and an exploration report from two medium size mining companies, Randgold Resources and Independence Group respectively. Investors will be looking out for such shareholder releases to check the progress of their investments, and the following comments will hopefully be useful in interpreting such company statements.

Reporting results

Profit/loss account

Opposite are the unaudited earnings figures for Randgold Resources second quarter to the end of June 2007.

Table 3.9 Unaudited earnings figures for Randgold

US$ '000	June 2007	Mar 2007	June 2006
Revenues			
Spot gold sales	70,752	70,483	66,684
Loss on matured hedges	(4,532)	(7,418)	(3,243)
Rolled forward hedges	(2,842)	235	(2,050)
Interest income	1,779	1,829	1,754
Other income	255	167	164
Total income	65,412	65,296	63,309
Costs and expenses			
Mine production costs	30,800	31,445	29,066
Production inventory and ore stockpiles	(472)	(3,740)	(7,697)
Depreciation, amortisation	5,821	6,072	4,962
General, administrative expenses	3,214	3,018	2,824
Total mining, processing costs	39,363	36,795	29,155
Transport, refinery costs	296	247	126
Royalties	4,191	4,037	4,129
Exploration, corporate expenditure	8,594	6,521	6,938
Exchange losses/(gains)	989	624	(146)
Unwind of discount on rehabilitation	96	96	84
Interest expense	1,848	751	1,537
Pre-tax profit	10,034	16,225	21,486
Income tax	(3,186)	(3,477)	(6,913)
Net profit	6,848	12,748	14,573
Minorities	1,084	1,330	819
Attributable to RR	5,764	11,418	13,754
Fully diluted EPS (USc)	8	17	20

Interpretation

A glance at the table shows that Randgold's quarterly profits are on the slide, although gold sales revenue has held up in the June period. The problem primarily has been an increase in exploration and corporate spending and a higher interest incurred figure. What has happened here is that exploration spending, which is a volatile figure, has risen sharply as the group's African wide programme steps up a gear. Also, Randgold has negotiated an increase in long-term borrowings, part of the new borrowings replacing a previous project finance facility which we can see in the balance sheet on page 220.

If one was looking at the figures blind and knew that Randgold was a gold miner, the conclusion might be that the gold price was on a declining trend over the period or that the mine itself was in decline, producing less in each quarter. That last view would be, on the face of it, confirmed by looking at the segmented information in the statement on the operating results of the Morila mine in Mali in which Randgold has a 40% stake. It shows a sharp fall in gold output and therefore in mining profits from Morila, but all is not quite as it seems (see next para). Unfortunately the expanding Loulo also ran into operating problems during the quarter but was able to increase gold output by drawing down ore from mine stockpiles. It also delivered less gold into its hedge in June and so received a much higher price for its gold than in the March quarter.

Randgold's primary operation now is the Loulo mine in Mali and, despite the short-term operating problems, the mine is on a growth tack. An improved Loulo profit due to a higher gold price received helped to mitigate the weak performance from Morila. However, a closer look at Randgold's report on Morila will have provided some comfort as the mine is about to access much higher grade areas of the orebody, and the operating performance should improve in subsequent quarters. It is, however, the case that Morila is now an ageing operation and mining may cease around 2012; whether it can extend its life beyond that date does depend on the success or otherwise of the energetic exploration programme at Morila which hopes to identify further orebodies within the lease.

Table 3.10 Morila results for the 2nd quarter to the end of June 2007

	June 2007 (US$ '000)	March 2007 (US$ '000)	June 2006 (US$ '000)
Milling			
Tons mined ('000)	5,379	5,015	6,006
Ore tons mined ('000)	791	935	1,591
Milling			
Tons processed ('000)	1,052	1,055	998
Head grade milled (g/t)	2.8	3.4	4.6
Recovery (%)	91.3	92.2	92.3
Ounces produced	86,832	103,244	135,387
Average price received (US$/oz)	668	652	628
Cash operating costs (US$/oz)	355	278	187
Total cash costs (US$/oz)	403	322	229
Mining profit (US$000)	23,700	31,803	51,443
Attributable to RR (40%)			
Ozs produced	34,733	41,290	54,155
Mining profit (US$000)	9,480	12,721	20,577

Table 3.11 Loulo results for the 2nd quarter to the end of June 2007

	June 2007 (US$ '000)	March 2007 (US$ '000)	June 2006 (US$ '000)
Mining			
Tons mined ('000)	3,616	5,707	3,934
Ore tons mined ('000)	517	657	724
Milling			
Tons processed ('000)	683	687	630
Head grade milled (g/t)	3.3	3.2	2.8
Recovery (%)	94.6	93.8	91.9
Ounces produced	70,660	67,908	51,233
Average price received (US$/oz)	605	543	577
Cash operating costs (US$/oz)	304	287	277
Total cash costs (US$/oz)	340	320	313
Mining profit (US$000)	18,711	15,337	14,416

With the mine operating results above, which appear on page 3 of Randgold's results statement, it becomes clearer what is going on. Indeed, a close read of the statement text would also have explained the decline in Randgold's earnings, but in a hurry the investor might not have had the time to read the statement immediately, relying only on the numbers for his first impression.

Fall in the ore grade

The true picture as shown in the operating results is that over the period shown the gold price had been improving steadily and Randgold's operations were expected to increase the tonnes of ore being processed, which is what one would expect with a young mine (Loulo) still in the expanding phase. Randgold's problem was a sharp fall in the gold grade of the ore mined at the mature Morila mine, which meant that total ounces produced fell back, undermining revenues despite the rising gold price.

Looking at costs

Returning to the income statement, we can see that production costs rose, this was partly due to weakness in the US dollar as well as rising fuel prices. This is ironic as the rising gold price, which is obviously beneficial to Randgold, was at least partly influenced by these two negative factors, thus creating rather the reverse of the old adage about an 'ill wind'. Depreciation is a relatively stable charge against profits at the moment but will certainly rise as Randgold's development programme accelerates. It is also a non-cash item, as is the loss on the rolling forward of some of the hedges. Exploration and corporate expenditure can be a volatile figure but for the present is on a rising trend. Other influences pushing up costs included the drawing down of stockpiled ore due to the temporary hiccup at Loulo; this had the effect of reversing previously deferred costs relating to the original production of the stockpiled ore. The expansion of Loulo also led to an increase in consumable costs, and this will continue, although it will be mitigated by hopefully not needing to draw down stockpiled ore in future quarters.

Interest figures

As far as the interest figures are concerned, interest expense rose sharply as a result of the new $60 million corporate revolving credit facility ($41 million of which has been drawn down) which is being used for the continuing expenditure on Loulo with the underground development and expansion in full swing. Interest received was lower than in March, as Randgold's cash balances (see the balance sheet) fell back slightly as a result of development spending at Loulo.

And don't forget to check the periods being compared

It is important when looking at these figures to understand what quarters are being talked about and compared. There may also be seasonal issues such as wet periods when mining activity naturally falls, and this sort of thing may provide quarterly operating differences that are outside the ability of the company to influence.

Balance sheet

Below is the unaudited balance sheet for Randgold's second quarter to the end of June 2007.

Table 3.12 Unaudited balance sheet for Randgold

US$ '000	June 2007	March 2007	June 2006
Non current assets			
Property, plant, equipment cost	324,373	308,054	272,047
Accumulated depreciation, amortisation	(68,432)	(62,611)	(43,621)
Deferred tax	1,041	2,654	2,385
Long term inventories, ore stockpiles	45,724	43,915	26,841
Receivables	14,568	13,856	-
Total	317,274	305,868	257,652
Current assets			
Inventories, stockpiles	35,839	35,161	39,956
Receivables	40,416	35,803	49,554
Cash, equivalents	137,313	139,407	151,531
Total	213,568	210,371	241,041
Total assets	530,842	516,239	498,693
Shareholders' equity	359,174	342,110	303,123
Minorities	7,121	6,037	3,436
Non current liabilities			
Long term borrowings	45,226	24,739	37,593
Loans from minorities	2,829	2,801	2,633
Deferred tax	462	462	-
Forward gold sales	42,277	46,693	50,261
Rehabilitation provision	9,033	8,938	9,661
Total	99,827	83,633	100,148
Current liabilities			
Forward gold sales	16,636	20,010	24,168
Long term borrowings (current portion)	3,496	24,819	24,779
Accounts payable, accrued liabilities	44,219	39,630	36,077
Tax	369	-	6,962
Total	64,720	84,459	91,986
Total equity and liabilities	530,842	516,239	498,693

Interpretation

An expanding, cash-rich company with a highly profitable mine

The balance sheet broadly confirms the position of Randgold as an expanding, cash-rich company with two profitable mines. One of the items that it would pay to keep an eye on if Randgold was an old and dying company is the net property, plant and equipment figure, which would shrink away to a very small number as spending slowed and depreciation continued to eat into the cost figure. As it is, Randgold's net value continues to rise as a result of expansion at Loulo, and spending on new projects may well come into the picture in 2009, when development of the Tongon project in the Ivory Coast could begin.

Very cash positive

Randgold's balance sheet is very cash positive, which would not be the position of a mining company with limited or no operational cash flow but with exploration and development commitments.

Navan Mining, a UK company with mining interests in Spain and gold interests in Bulgaria, went under in 2003 as its base metal mines in Spain bought with loan finance suffered a sharp reduction in revenues as metal prices crashed. Its balance sheet became hopelessly over-geared (borrowings far exceeded the realisable value of the assets) and revenues were unable to cover the cost of financing the debt liabilities. What would have thrown doubt on the balance sheet value of the company's assets was the substantial losses on the income statement.

In Randgold's case all is extremely healthy. It is also interesting to note the provision for environmental rehabilitation which in recent years has become a defined item in more and more mining company balance sheets. Randgold's provision has been fairly steady for a few quarters now, but with the expansion of Loulo and with Tongon now on the horizon that figure is likely to expand over time.

Position of the hedge book

The forward gold sales liabilities, essentially the current carrying value of Randgold's hedge book, is a reflection of the fact that some gold mines still hedge (sell their gold forward at a fixed price). Randgold has a small hedge book to provide price protection during the Loulo development and expansion, but there are no longer any hedges outstanding relating to Morila. Randgold, also in the June quarter, rolled out some of its maturing hedges to 2010 to cover longer term work at Loulo; this did not increase the total hedge in terms of ozs but merely transferred the ultimate liability forward three years, obtaining an enhanced gold price but incurring a loss on the roll forward that is charged to the P&L. Other gold miners still retain hedge books and the potential liability figure (charged to the income statement when realised) may be a growing one if, as is likely, their gold has been sold forward at a lower price than the current spot price of gold. As a result of this problem, in the last couple of years many of the most enthusiastic hedgers, such as Barrick, have materially reduced their hedge book, and like Randgold mainly hedge to provide price protection during the mine development stage.

Cashflow statement

Opposite is the unaudited consolidated cash flow statement for the half year to the end of June 2007.

Table 3.13 Cashflow statement for Randgold

US$ '000	June 2007	June 2006
Pre-tax profit	26,259	39,908
Non cash items	15,620	16,699
Changes in working capital	(7,577)	(8,996)
Tax	(6,072)	(3,664)
Net cash generated	28,230	43,947
Additions to property etc	(26,534)	(35,716)
Financing contractors	-	105
Net cash used, investment	(26,534)	(35,611)
Ordinary shares issued	840	751
Decrease in long term loans	(1,705)	(10,008)
Dividends	(6,874)	-
Net cash used, financing	(7,739)	(9,257)
Net decrease in cash	(6,043)	(921)
Cash at beginning of year	143,356	152,452
Cash at end of year	137,313	151,531

Interpretation

In essence the cashflow statement above brings the P&L and balance sheet together. As we have already noted, the June quarter did see some operational setbacks that Randgold has addressed and which should see results improving over the next few quarters. The company has begun to pay a dividend and continues to expand and invest. The cashflow statement shows no strains at all and, though cash and cash equivalents at the end of the June period had fallen, Randgold's cash position is very comfortable.

Summary

In conclusion, investors need to keep their eyes on the reported results statements as mining can be a highly volatile business, and changes in the wind can show up in the figures before the storm sets in. The main thing is for investors to watch out for anomalies. Revenue figures can mislead as mines may be temporarily producing above budget due to high grades or stockpile sales or vice versa. Net profits may contain special unrepeatable profits or one-off losses. Cost figures may also oscillate due to temporary problems such as a sharp fall in output, or for more fundamental reasons like accelerating labour costs. If there is a cash flow statement, that may also be revealing. Net generated cash may not be sufficient to cover bank borrowings needed for group expenditures, for example. If something is not as it should be it should come out in the results report, and a sharp eye will hopefully spot it.

Exploration reports

The perception of news

When mining markets are buoyant some of the most eagerly awaited news can be the release of drilling results from companies with enticing exploration projects. A good result will usually lead to great market excitement. However, in a mining bull market even ordinary drilling results can be greeted with unwarranted enthusiasm, and if the market is really hot downright dull results can receive a mystifyingly positive welcome also. In stark contrast, in a mining bear market you could find King Solomon's Mines themselves without raising the remotest investor enthusiasm.

Example: drilling results for Tropicana JV

In the next table, we can see some recent drilling results from Australia's Independence Group and AngloGold Ashanti at their gold exploration JV in Western Australia. The project is the Tropicana prospect, around 400kms north east of Kalgoorlie/Kambalda where Independence has a nickel operation.

Table 3.14 Tropicana JV results (June 2007)

Hole No	Northing	Easting	RL	Azimuth	Dip	EOH	From	To	Intercept
	(m)	(m)	(m)	(degree)	(degree)	(m)	(m)	(m)	(m g/t au)
Tropicana Zone Drill Holes									
TPD226	6763497	651170	341	324	-59	241	164	210	46@4.6
TPD227	6763462	651210	341	326	-63	267	194	220	26@2.0
							223	240	17@2.4
TPD232	6763427	651099	342	322	-59	241	184	203	19@2.4
Havana Zone Drill Holes									
TPD084	6762067	650133	360	326	-62	n/a	319	358	39@3.3
TPD126	6761569	649844	369	318	-59	304	185	212	27@2.0
							239	256	17@3.4
TPD129	6761534	649810	368	318	-63	252	167	188	21@2.3
							272	287	15@5.6
TPD135	6761357	649777	368	316	-63	262	183	200	17@2.2
TPD327	6761782	650060	359	312	-68	174	93	95	2@16.1
TPRC662	6761338	649368	360	327	-60	125	53	80	27@8.1
TPRC671	6761287	649282	355	315	-60	140	59	76	17@3.3

What does the table mean?

The results for the Tropicana drilling contain a number of columns providing figures that should help investors to get an idea of what may be afoot at the deposit.

- The *northing* and *easting* columns are measurements which locate the exact position of the drill hole.
- *RL* (reduced level) provides the elevation of the drill hole.
- *Azimuth* refers to the direction in degrees in which the hole is drilled. In the above column the holes are in a rough NW direction.
- *Dip* refers to the angle from horizontal at which the hole is drilled.
- *EOH* gives us the total depth of the drill hole.

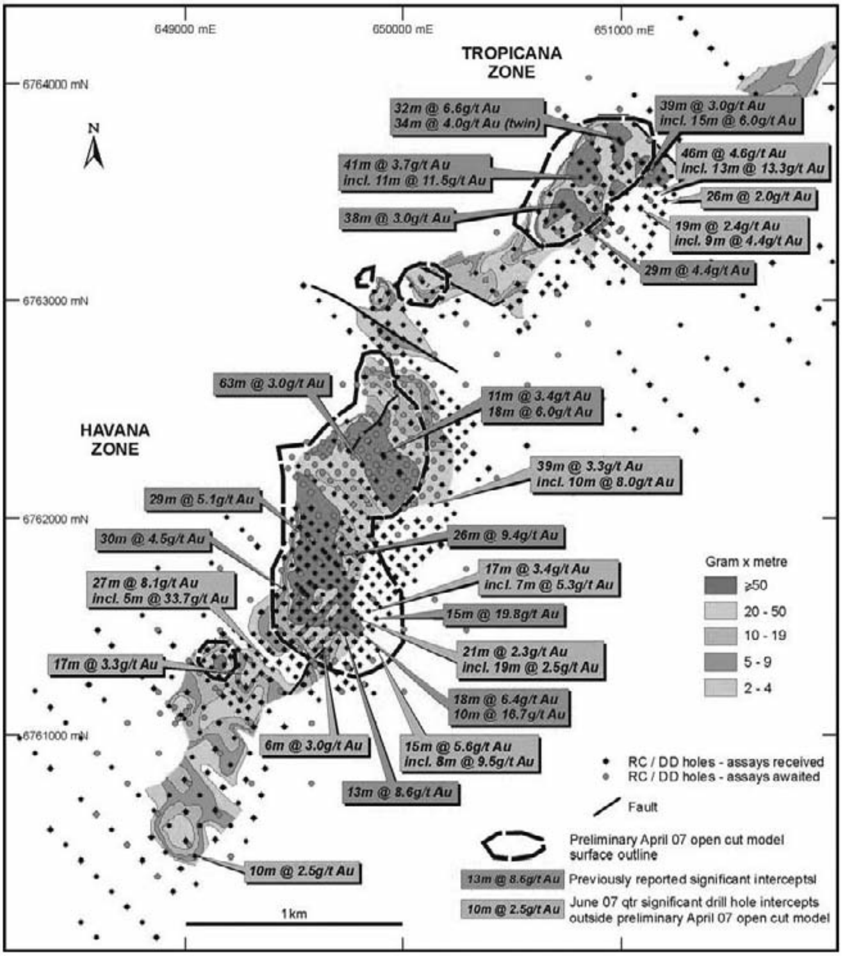
Not all companies provide the locational and directional information we get from Tropicana. Many will simply provide tables with drill hole numbers and details of the hole covering drilled lengths of mineralisation and the metal grades.

Looking at the results themselves the intercepts of the mineralisation are consistent, the widths being generous and the grades satisfactory, particularly since the depths are amenable to open pit exploitation; open pit mining should be possible down to at least 300m and in certain cases, depending on pit configuration, somewhat deeper. Also, within some of the intercepts there are higher grade portions, for instance in hole TPCR662 there is a 5m section which runs 33.7 g/tonne, or around 1oz which is very high grade. If enough of this kind of material can be identified, and there is a discernable pattern to the mineralisation, then the mine plan may be able to be adjusted to take advantage of the high grade section, which could positively impact on early project cashflow.

Significance of a dead hole

In any drilling programme some holes may show no mineralisation, although in our study case, Tropicana, no dead holes have been reported by the JV partners so far. If one was reported in due course would it be a worry? The answer could well be no, although it might be yes in cases where there have only been a few holes drilled and where a dead hole might signify that mineralisation on the property in question is sparse and therefore probably uneconomic. A dead hole may in fact simply shut off the mineralisation beyond the hole drilled, although in a situation like that the company will have to do more interpretation of the geology, and possibly more drilling, to confirm whether that is the case.

Figure 3.14 Tropicana Drilling Map



Source: Independence Group June 2007 Quarterly Report

Terminology

When an exploration programme has been successful in discovering mineralisation and has done a fair amount of drilling, reports may use some of these terms – open at depth, open along strike, open to the north/south/east/west, open in all directions. Exploration results may also talk about dip – the angle that the orebody lies at and its thickness. What these terms are telling us is, in the opinion of the explorer, that the deposit has further potential for expansion in the direction indicated

Drill types

The Tropicana results we are looking at show the work being done by a reverse circulation drill and a diamond drill.

- *Reverse circulation* drilling is used when drilling relatively shallow exploration holes and it is relatively cheap and quick, with the rock coming out in the form of chips or a more conventional core.
- We can also see that below 200m the Tropicana JV has used a diamond drill. Although more expensive, *diamond drilling* provides a conventional core which avoids the possibility of contamination.

Two other drills sometimes used in exploration, which also deliver chip samples, are *rotary* and *percussion* drills. The problem with chip samples is that in the hands of unscrupulous promoters they can be easily ‘salted’ with gold from outside.

The Tropicana drilling results look good

The Tropicana figures suggest the possibility of a substantial future gold mine in the making. Including results from other drilling done at Tropicana we could be looking at 4km plus of strike length, with mineralisation down to at least 200 metres from 50 metres and orebody widths of between 20 and 30 metres.

At this stage, though, any attempts by investors to come up with a possible size figure, in tonnes, for the orebody is fraught with danger. Such calculations are best left to the company to do and then announce with guidance notes. Currently the JV has begun to work on a pre-feasibility study which should be completed by mid 2008 following the JORC compliant resource announcement at the end of 2007. and begun to prepare a preliminary JORC compliant resource figure which is expected by the end of 2007. However, ahead of such announcements, there will be mining analysts and investors who do have a go at a ‘back of envelope’ calculation.

Rough calculation – take care!

The sort of calculation that they might try to make is based on assumptions and therefore would provide only a very tentative possible figure. So they might assume that after the announcement the orebody had a minimum of 500 metres of strike length and a width of 50 metres on average to a depth of 200 metres. That could give us at least 5 million cubic metres of mineralised ore and the contained material could weigh 2.5 tonnes per cubic metre (sometimes more depending on the ore), providing us with a figure of 12.5 million tonnes of mineralisation. Whilst calculations like this may be fun, and may give a possible order of magnitude for the size of the orebody, they are far too provisional and speculative to allow much certainty. However, in mining booms people will give them house room and if the market is very bullish some credence will be given to even the most sketchy calculation (see later section 'Valuing an exploration play', p244).

Don't be distracted by too much technical detail

Many reports, particularly in the early stage of exploration, will contain a lot of technical details that will most probably not be very price important. There will be talk about geophysical and geochemical surveying, an important part of a proper exploration programme, but part of the work that needs to go on to identify targets for drilling, and thus very much an early stage procedure. There may be talk of identifying anomalies which sounds exciting, but these direct drills to potential mineralisation, and it is only drilling that will prove whether there is anything economic around. During the programme it is likely that the exploration team will take soil samples. These may turn out to have no mineralisation present or may have promising amounts in the sample. Since these are usually taken from very shallow depths, follow-up drilling will have to be done. Sometimes promising surface sampling can indicate economic mineralisation below, sometimes there is nothing there, so investors need to be wary about jumping to conclusions too quickly. Sometimes, as we saw a lot in the Australian mining boom in the 60s, excitement can be engendered by one good looking drill hole which to the detriment of the particular company's share price is not repeated in subsequent reports.

Summary – handle exploration reports with care

Exploration reports should always be handled carefully. Like so much in the mining sector a higher risk approach probably pays off in a bull market, but interpreting exploration reports, more than any other aspect of mining sector investment, proves the point in the end that a little knowledge can be a dangerous thing.

4. Valuing Mining Shares

We now come to the vexatious issue of the appropriate method for valuing mining shares.

As the long industrial equity bull market, which started in the mid 70s when despair was at its deepest, entered its final stages with the collapse of first the internet boom and then 9/11, market strategists sought to attach some precision to valuing shares in order to underpin the new paradigm of perpetually rising equities. Part of this search for new valuation techniques was in response to a rising dissatisfaction with the conventional measurements of dividend yields and price earnings ratios, something that veterans of past mining bull markets will have some experience of. Of course cynics might suggest that the stock market needed new valuation markers to sustain share prices that when conventionally measured by PE and yield had clearly left *terra firma* well behind. Two of the valuation indicators that we will be considering – ROCE/WACC and EVA – were particularly fashionable at the peak of that previous equities bull market in 1999.

The issue for mining shares is whether conventional valuation and measurement methods, such as the PE and yield, are really applicable to such a volatile sector which exhibits certainly unusual, if not quite unique, characteristics.

For example, as we have mentioned before, the fact that a mine has a finite life means that when all ore is exhausted it ceases to have any value. A mining finance house must always then be spending money on finding new mines to replace those coming to the end of their lives and these new mines will often be far distant from the old operations. When a factory becomes old it can be knocked down and a new factory, perhaps making a different product, can be erected on the site of the old one. Also, the price of mined products are extremely volatile compared with the output of a factory, be it cars, electronic goods, food products, or whatever.

In the following section we will consider some of the most widely used valuation techniques as they apply to mining shares. We will first look at valuation methods for producers, and then techniques for valuing exploration plays.

Valuation methods for mining companies

Sector PE ratios

The PE, or price earnings ratio, where the earnings per share after tax are divided into the share price, can be useful as a quick guide for comparison of peer group stocks. Within the UK mining finance sector it gives investors a guide as to which stocks are out of line with the mean, enabling them to seek reasons for the ratings difference.

In basic terms:

- A **high PE** for a mining share might be signalling anticipation of a substantial uplift in earnings in the future due to new mines coming on stream. For a more mature mining company a high PE might simply be indicating that current earnings have dipped sharply, probably due to lower metal prices which are expected, nonetheless, to recover quickly.
- A **low PE** will usually signal the reverse of the above, and also possibly the market's view that a country risk may attach to the share.

Since a mining finance house or group is expected to replace its historic production over the longer term, the wasting nature of its assets – its mines – does not preclude the use of the PE for valuation purposes.

The PE works less well for single mine companies, but following the consolidation of the South African gold mining industry, which used to be made up of predominantly single mine companies, most listed mining companies now seek to develop a suite of mines and build a long-term future. The dividend yield, by which the declared dividend per share is divided by the share price, provides a current guide to the cash return to shareholders, enabling comparisons to be made with risk-free returns from bank deposits and gilts. The problem with dividend yields is that a low return might indicate either of two quite different things:

- that only a **small dividend can be afforded,** or
- that the **return is likely to grow very rapidly** in the near future and the market is pricing in the prospect of rapid dividend growth.

The above relates substantially to other market sectors as well, but in certain cases mining PEs and yields can be flashing sector specific warnings.

In particular where a forecast PE is low and the yield high this may well not be signalling an attractive buying opportunity if the stock in question is a single mine producer. What may be happening is that the mine has only a couple of years profitable life left and is planning to pay out all its earnings in the form of dividends, hence the high yield. The share price is low, thereby generating the low PE, because whilst the earnings are healthy the very short life of the mine makes their amortisation by the shareholder essential. In such circumstances the share price can only really match the expected flow of income to the end of the mine's life. Now, some investors may want to gamble that the mining company will be able to find new sources of ore, often possible if the relevant metal price is increasing at the time, and therefore the attractive short-term income flow is some compensation for the risk that no more ore will be forthcoming from the exploration effort. But this is a decision requiring great care, as the risk is that an investor will end up with a couple of years of nice dividends and a worthless piece of paper at the end.

In terms of where mining sector PEs stand in relation to the broad market, the sector's historic volatility is the key. So in a metals downturn PEs of sector leaders will fall below the market average, and vice versa during a metals upturn. Part of this relates to the trailing nature of often highly volatile earnings, with high historic PEs often signalling a sharp upswing in the next reported earnings. But when the sector is running strongly, high PEs often simply reflect investor enthusiasm for mining shares.

Below can be seen the PE range for the five main diversified UK mining companies over the past six years (Vedanta only listed in December 2003). What we can see from the PE range is that ratings were relatively high in the early stage of the boom as investors began to realise that surging metal prices would soon begin to feed through to earnings. The historic PEs have come down over the last couple of years as investors start to wonder how long the metal cycle, and therefore mining company earnings, will remain in an upswing. Although 2007/08 takeover excitement did generate some strong, short-term upward moves.

Table 4.1 Annual PE range for selected UK mining companies

	2002	2003	2004	2005	2006	2007
Anglo American	16-9	21-10	22-18	20-11	19-12	17-11
BHP Billiton	16-14	29-13	20-14	17-10	13-9	16-7
Rio Tinto	18-11	22-13	12-9	13-7	11-8	21-9
Vedanta	n/a	n/a	26-18	25-11	25-12	14-6
Xstrata	55-26	26-12	10-7	11-6	9-4	13-8

Source: Financial Times, Company Annual Reports

Discounted cash flow/net present value

For a more explicit valuation of diversified mining groups the *net present value* (NPV) based on the forecast future discounted cash flows has a respectable following.

Here the value of a mining group's after-tax earnings over ten to fifteen years is calculated, and then discounted back using an appropriate interest rate, these days between 5% and 10%. It might be argued that operations in high inflation countries like South Africa and some Latin American countries should carry a higher discount rate. However, it must be remembered that virtually all metals are priced in hard currencies, particularly the US$. This means that if local currencies are consequently weak because of high inflation, operating margins may not be affected as revenues, and thus returns, may keep pace with rising costs. Whatever the rate used, the discounted results in today's money are then aggregated to give a final net present value per share of the group's earnings potential which can be compared against the current share price.

Using this measurement does entail making heroic decisions about the metal prices to be used in calculating the stream of income, but it does in the end give a calculated value for the group's shares, which can be compared against the market value of the shares. An NPV, however, can end up giving a result materially higher or lower than the market share price, and it may be that whether the result is higher or lower relates to where we are in the mining sector cycle.

Example: Net present value calculation

Using internal management earnings figures from a small UK company developing a mine in Asia, we can see below the forecast discounted cash flow (taxed earnings) discounted back to give us the NPV of the mine. The mine may have a longer life than ten years and the effect on the cash flow of using a relatively low discount rate of 5% is much more gradual than if a higher rate had been used. For instance, if you wanted to be conservative and use a 10% rate, which would be rather drastic today bearing in mind that interest rates and the rate of inflation are allegedly well below 10%, the sort of effect that that would have on the figures below would be to reduce the current NPV of Year 10's cash flow to around £4.5 million rather than £8.1 million. In relation to the NPV the company's market value suggests that there may still be value in the shares.

Table 4.2 Forecast discounted cash flow

Year	0	1	2	3	4	5	6	7	8	9	10
Cash flow (£m)	(8.8)	(1.6)	8.5	18.9	16.7	14.8	14.1	11.6	9.4	13.2	13.2
NPV (5%) (£m)	(8.8)	(1.5)	7.7	16.3	13.7	11.6	10.5	8.2	6.4	8.5	8.1

	(£m)
Total cash flow	110.0
Total NPV	80.7
Company market value	49.3

Internal Rates of Return

Internal rates of return (IRR) represent the reciprocal of the NPV. The IRR that the NPV gives us as a percentage of the share price can then be measured against the discount rate used in arriving at the IRR. If the IRR is higher than the discount rate the share is good value, but that does, of course, beg the question as to whether the correct discount rate has been used. In a period of very low inflation a low discount rate can be used and vice versa, but mining companies operate in a variety of countries with often differing inflation rates and this will need to be borne in mind when selecting the appropriate discount rate.

Rough and ready methods

Two rough and ready methods frequently used in valuing mining shares are *net assets per share* and *metal value per share*.

Net assets per share

This relates primarily today to historic conditions that used to rule in the glory days of the old South African mining houses when the great percentage of their assets were in listed associates and subsidiaries. It was thus possible to calculate the market value of their listed assets and the result, with the directors value of unlisted subsidiaries and balance sheet items added in, would give a value for the company that could be compared to the market value of the mining house. Today, however, even traditional mining groups like Anglo American have most of their assets in the form of unlisted wholly owned operations.

Metal value per share

Metal value per share has been widely used for some years in the gold sector to try and calculate an overall value that can be used for sector comparisons for operating and developing gold mining companies.

There are difficulties with this approach as some gold groups have high cost resources and others have low cost reserves. If the exercise is being carried out at a time of low gold prices, and so a low gold price is used for valuation purposes, the result can give a false impression of the relative attractiveness of a company with high cost resources. The share price of the company will be low because the market knows that its gold resources are uneconomic at the time. However, unsuspecting investors will see that the underlying gold value per share of its assets looks very interesting when compared to its far more robust low cost peers. The answer is to apply a discount to the high cost resources, but the problem is how big a discount. Some would ignore such companies in those particular circumstances, but a rise in the relevant metal price could well pitch these companies right back into consideration.

In short, metal value per share could work quite well as a forward looking tool but anyone using it must be aware of the pitfalls. Julian Baring used a rough and ready formula for the discount which simply applied a value to the reserves and resources of 10% of their contained metal. Others vary the percentage discount figure and even make it two tier as between reserves and resources. Neither approach is scientific, nor ever likely to be, but results do enable relative value calculations to be done against other companies in the peer group.

As a variation on this, many analysts and mining companies, particularly in the gold sector, draw up peer group comparisons by dividing a company's market capitalisation by either its annual production or its measured reserves, and sometimes add its indicated and inferred resources to the reserves figure. The upshot of this is that a current value per oz of gold in these categories can be calculated and then peer group comparisons can be made. The problem with this kind of approach is that the figures must be precise and exactly comparable, or comparisons and consequent conclusions may be unsound.

Example: Metal value per share

For an example of how this would work in practice we can look at the 2007 output and resources figures for gold miner AngloGold Ashanti. The calculations are simply done by taking the market capitalisation of the company (in US$) and dividing that to give us a per oz figure for production, reserves and resources. The result can then be compared with peer group companies. Whilst a gold miner has been used for the purposes of illustration, any metal producer could be compared in a similar way.

Table 4.3 AngloGold Ashanti's market cap (Jan 2008) per oz

Market cap US$m	**Production** ozs/yr	**Reserves** Ozs	**Resources** Ozs	**Market cap per oz US$**		
				Production	Reserves	Reserves & Resources
12,170	5,635,000	66,900,000	114,700,000	2,160	182	106

In similar vein you could also take the number of shares in issue and divide them into production, reserves and resources to give a figure for ozs per share. The analysis could then be extended to value that oz per share figure and then compare it with the share price as in the table below.

Table 4.4 AngloGold Ashanti's metal value per share

Share price $	**Issued shares**	**Ozs per share**			**Value ($850) of ozs per share $**		
		Production	Reserves	Reserves& Resources	Production	Reserves	Reserves& Resources
43.86	281.8m	0.02	0.24	0.64	17	204	544

Looking at the results of that exercise one can see that AngloGold Ashanti is perhaps a little expensive on the basis of its current production, with a gold revenue value per share well below its current share price. Although this is common in the gold sector these days and probably relates to the fact that many think that the gold price, valued at $850 for this exercise, will go higher in due course. In terms of reserves and resources the situation is very healthy with over thirty years' production at current production rates..

Some analysts like to use a front end measurement figure depicting value per oz in the ground. So if they are looking at a Canadian gold miner they may take the view that the value of Canadian gold in the ground should be US$50/oz. If they find a company where the value of its gold in the ground calculated by dividing its market capitalisation by total resource ozs comes out at, say, $25 then that company is cheap. This has the merit of being simple, but as we said earlier in this section the estimated costs of producing that oz of gold must be taken into account, so crude valuations based on metal value can be misleading.

ROCE/WACC

We next come to ROCE/WACC – a company's return on capital employed compared to its weighted average cost of capital. Although this concept was all the rage in the 90s it is not a new concept at all, and stock market commentators and economists were aware of it decades ago. The basic thesis behind the concept is that companies destroy shareholder value if the return (crudely, operating profit minus tax) on their capital employed (equity plus debt capital) falls below the weighted average cost of that capital.

How well this works, particularly for mining companies, is open to question but its supporters proselytise aggressively in its favour. Unfortunately it is quite possible to adjust one of the WACC factors, the cost of debt, to a company's advantage as Anglo American did when it moved its incorporation from South Africa to the UK. Using long-dated gilt rates for the calculation, Anglo's theoretical WACC fell sharply as UK gilt rates were in the 5-6% range against South African gilt rates in the 12-13% range.

The thesis of destroying shareholder value, however, can be too theoretical, and during bear markets even if the ROCE/WACC ratio is above 1, i.e. the company is supposedly creating value for shareholders, the chances are that the company's share price, in line with the market, is falling in value which is the most painful manifestation of capital destruction, particularly at the portfolio level. In some contrast, a few years ago in an unpublished look at ROCE/WACC and the mining sector, the global mining research team at French bank Paribas discovered that in the 90s Canadian aluminium giant, Alcan, had consistently posted a ROCE/WACC ratio below 1; its share price, however, steadily improved throughout the decade. Perhaps even then insiders knew that Alcan was a takeover target, although its acquisition of Pechiney in 2003 might have temporarily unsettled them.

Enterprise Value (EV)

Another valuation measure much used is enterprise value (EV), which is simply the aggregate of a company's market capitalisation plus the market value of all non-equity finance (debt, convertibles, warrants) either on or off the balance sheet and minus any cash holdings.

This is a possibility for valuing large mining groups where an appreciable percentage of the assets are fully developed and providing steady cash flow, but where there are enough new projects to enhance that cash flow over the medium term represented in part by the non-equity finance. In order to get a multiple that can then be compared with peer group companies a profit measure, often EBITDA (earnings/profits before interest, taxation, depreciation and amortisation), can be selected and divided into the EV. Theoretically the higher the multiple the more expensive or, conversely, the more highly rated the share.

Example: Enterprise Value

Taking the example of the BHP Billiton group:

1. We have a market capitalisation of $167.8bn
2. Net debt at the final stage (June 2007) of $7.8bn
3. Giving an enterprise value of $175.6bn
4. The final EBITDA figure was $20.1bn
5. If we then divide the EV by the final EBITDA for BHP Billiton we get a multiple of 8.7

This can then be compared with other peer group companies such as Anglo American whose current EV is $70.4bn and EBITDA of $12.2bn (December 2006 final results) to give us a multiple of 5.8, which makes Anglo American either considerably cheaper or less highly rated than BHP Billiton.

A number of conclusions could be drawn from the different multiples:

- the market prefers BHP Billiton to Anglo American,
- Anglo's earnings upturn is thought to be less sustainable than BHP's, and/or
- BHP is more expensive for a particular reason, etc.

The difference could provide a switching opportunity if a look at both companies reveals no obvious reason for the value differential, especially as some mining observers believe that Anglo could be a takeover target. There is the added problem that BHP is embroiled in a drawn-out bid for Rio Tinto, which has reduced its EV as the market worries whether it will be forced to pay up to win the day.

Economic Value Added (EVA)

Economic Value Added (EVA) is another measure which was widely used in the 90s. Then market movements seemed to be under the perpetual control of the new investment banking giants and their expanding technical analysis departments as they churned out, with growing confidence and authority, theoretical share valuations. EVA recognises that invested capital expects a return for its use and that genuine profit is the excess left over, after the allocation of a charge for its use, to invested capital. So EVA comes out as net operating profit less adjusted tax minus the return on invested capital as calculated by using the company's WACC (%).

The thinking behind this measure is that a company only deserves a value in excess of its invested capital if it generates a return above the cost of that capital. I suspect that EVA, though conceptually reasonable, may be a little too complex for easy use. It may, though, offer some help in assessing mining share value, in that the sharp swings that metal prices experience, and the inevitable effect on mining company earnings of those swings, could be useful in a cyclical sector in pointing out moments of potential under- and over-valuation. The point being that mining shares returns on capital can at times swing wildly. In what is sometimes a contra-cyclical sector, that could mean that when the return has slipped below the company's WACC this might be a clear buying signal despite the likely claims that the company was destroying value. One must also remember that in a low interest rate environment a company's WACC will reduce.

Valuation should not be dogma

The construction of valuation tools is understandable as investors from all levels attempt to provide themselves with the comfort of a little certainty in their sector and stock picking. It is also true that the tightening up of insider dealing rules and other regulation has taken away some of the tried and trusted methods of the past. However, too much dogma in this area may well lead to a hardening in the investment arteries, particularly of private investors, whose investment style has historically always been more intuitive than that of the professional institutional investor. In short, the interested investor should establish a body of knowledge on the mining sector and then trade momentum on a short, but hopefully profitable, rein.

Valuing an exploration play

The above valuation methods depend on the mining group having earnings, dividends or reserves and resources to be used in any calculation or peer group comparison. In the case of an exploration share the process of evaluation is much harder but, bearing in mind what we said earlier about calculating the size of Independence Group/AngloGold Ashanti's prospect at Tropicana, we might proceed by creating a virtual company for the purposes of demonstration.

Our virtual company may or may not have some mineral production and therefore income, but its value will be materially affected by a big mineral discovery. Our company has a wide ranging exploration programme, and for the purposes of this example it is looking for copper and its exploration properties look particularly promising.

Results from the first drill hole are encouraging

Following a programme of exploration, the company announces it has struck copper on one of its properties. The discovery is based at this early stage on just one hole; others are being drilled but results are not immediately to hand. The hole itself goes down 100 metres and has mineralisation from 20 metres down to 100 metres at which point the drill was stopped. Over the 80 metre intersection the sample assayed a very healthy 2.25% copper. Since the hole was stopped in mineralisation at a relatively shallow depth the prospect of a low cost open pit copper mine beckons (an open pit operation can work down to 300 metres, and depending on ground conditions, even deeper than that). But first results from the other holes being drilled are needed. In due course other fairly widespread holes report similar results to the first one.

It is worth noting here that the grade of metal in the ore can be economic even when it is low (0.5% would be low), if the deposit was both large and shallow and the ore could be easily mined and treated. Rio Tinto's Bingham Canyon mine in the US, which has a reserve grade of 0.6%, would be an example. Conversely, a high grade project like Konkola Deep in Zambia, where the grade is 3% plus, may be uneconomic due to the depth and the huge water inflow.

The shares surge, but what value should be given to the company?

The shares take off in excitement. At this stage the issue of valuation comes in. A ready method of applying some value to the prospective mine would be by using a 'back of envelope' technique. Since an investor rarely has access to the property, even if he could get there, and no exposure to the inside chatter going on about the find, he must make do with his own devices. He could proceed thus:

He has results from eight holes. The mineralisation runs east/west and four of the holes have been drilled along this strike – one every 100 metres. Four holes have been drilled 50 metres to the south as the exploration manager believes that the mineralisation dips in that direction also, and he is correct. It will take a few months to formulate and carry out further drilling but the idea will be to drill some holes outside the present grid of mineralisation and probe whether the orebody extends beyond. Other holes will be drilled within the grid to confirm the mineralisation has continuity along its strike length.

Calculating the mineral value

For the moment, investors or potential investors have no idea whether the company's rising capitalisation spurred by the discovery is reasonable. A few heroic calculations are needed therefore for holding purposes.

1. The current extent of the deposit is 300 metres by 50 metres by 80 metres or 1.2 million cubic metres.
2. That last figure multiplied by 2.5 tonnes per cubic metre weight gives us a rough guide as to the volume of ore indicated so far, 3 million tonnes.

3. The grade is 2.25% copper, suggesting a situ figure of **67,500 tonnes** (149 million lbs) of copper.

A nice start but unlikely to be big enough to be developed without more ore being found. At a copper price of US$3.00/lb the value of the deposit, using Julian Baring's 10% of value yardstick, is just short of **$45 million**.

But the orebody may be larger…and the shares surge forward again

Now, since this is a virtual or make-believe company we will imagine that in all the excitement of the discovery its market value, which was a modest $9 million at the start, has risen to $80 million, well ahead of the imputed value above of the new find as it stands. But, of course, the drilling programme is in its infancy and rumours are circulating that the strike length could be over 1,000 metres and the ore goes down at least another 100 metres. The orebody also may extend 200 metres to the south. If this rumour proves true and the grade holds up then the size of the orebody could be over ten times the size of the presently indicated 3 million tonnes. The market gets the bit between its teeth and the shares double for a market capitalisation of $160 million.

But our virtual investor is in a quandary; is this a fair valuation for the company at such an early stage of its life?

Introducing more precision, calculating the net present value

To get a better idea of what we might have we now return to our 'back of envelope', but replace the value of metal in the ground with a more precise valuation method – the net present value. We have, though, to make heroic assumptions again. However, since we are in a highly charged market there is a need to try and establish some valuation level to avoid investment decisions regarding our virtual company being made completely in the dark. Looking at other similar deposits that have been brought to production the investor can come up with a possible, if speculative, structure for the deposit based on the, also speculative, belief that the deposit will turn out to be at least as big as the market rumours suggest. We have, incidentally, assumed that we are in a metals bull market where optimism drives the market for the moment. We fix on the parameters of a possible mine as below.

Table 4.5 Parameters of the virtual discovery

Annual production	80,000 tonnes (176 million lbs)
Total development costs	US$500 million
Year of first full production	Year 4
Copper price	$3/lb copper
Revenue/year	$528 million
Operating costs @ $0.65/lb/year	$114 million
Financing @ 7%/year	$35 million
Depreciation over 10 years/year	$50 million
Net profits until year 3/year	$329 million
Tax from year 3 @ 30%/year	$99 million
Total undiscounted profits over 10 years	$2,498 million
NPV discount rate	7%
NPV over 10 years	$1,209 million
Current market capitalisation	$160 million

But we must question the assumptions made

If we are confident of the rumours of a much bigger orebody which might allow an operation of the size shown above, then the shares may still be cheap. However, since the possible mine will not produce for four years the shares are really a long-term situation and additional discounts could be applied to the earnings flow to take account of this. Some analysts would apply a larger discount rate than 7% for the period of development until first production, others might arbitrarily cut the value of the cashflow being discounted during the development period. We must also not forget the knotty problem of what metal price assumption we want to make. Usually it is appropriate in speculative situations to use a price comfortably below the current market level for reasons of prudence. In a roaring metals bull market, as we have now, the shares may, however, reflect a far more optimistic mood and the metal price used may well be based on the cyclical peak level. Judging the valuation level of an exploration share on this basis will almost certainly lead to tears, although in our virtual situation above, with the theoretical NPV seven times higher than the share price, there is plenty of slack to allow for one or two disappointments as the drilling programme proceeds – that is as long as they are not terminal for the project.

Be wary of irrational exuberance

All this has to be taken into account during the exciting early stage of exploration drilling when calculating what the new mine might reasonably be worth if brought to production. Of course, excitement about the discovery can, indeed often does, lead to gross overvaluation of the shares. During the course of this excitement experienced mining analysts may produce valuation matrices that support the market madness. On occasions their work may be correct but in many cases it will not, being more akin to the wish being father to the thought. Sometimes this may be due to enormous pressure from the company (Bre-X for example), sometimes it may be due to the current position of the analyst's employer (i.e. corporate activity).

The problem with exploration is that it is exciting in the beginning but, following a decision to develop a new mine, the next stage, which in some cases can last several years as the mine is built, is often a quiet one in market terms. So in the end dabbling in mining exploration shares has to carry a *caveat emptor* warning. But it is great fun, and it can be rewarding if you are not too greedy and you have created a credible valuation measure which you are comfortable with and to which you are going to stick.

Defining reserves and resources

Throughout the book I have talked a lot about *reserves* and *resources*, terms that historically have often been bandied about in a reckless manner. Today the terms have a very specific definition and in explaining them I will quote extensively from a paper given by Steve Vaughan of McMillan Binch and Sonja Felderhof of Aird & Berlis (both of Toronto) to a Mineral Law seminar in Nevada in July 2002. The definitions given draw heavily on the guidance of Australia's Joint Ore Reserves Committee (JORC), the Canadian Institute for Mining (CIM), the US Society for Mining, Metallurgy and Exploration (SME), and the South African Code for Reporting of Mineral Resources and Mineral Reserves (SAMREC).

Below are Vaughan and Felderhof's definitions for the main categories of reserves and resources.

Mineral/ore reserves

> "The guidelines provide that Mineral Reserves result in an estimated tonnage and grade which can be used as the basis of a viable project in the opinion of the Competent Person. The term *Mineral Reserve* need not signify that extraction facilities are in place or operative or that all governmental approvals have been received."

Mineral resources

> "A Mineral Resource is a concentration or occurrence of material of intrinsic economic interest in or on the Earth's crust in such form or quantity that there are reasonable prospects for eventual economic extraction."

Measured resources

> "A Measured Mineral Resource is estimated in the same manner as an Indicated Mineral Resource (*below*), except that (1) it can be estimated with a high level of confidence; (2) the information must be detailed and reliable; and (3) the locations (*drilling*) are spaced closely enough to confirm geological and/or grade continuity."

Inferred resources

> "An Inferred Mineral Resource is that part of a Mineral Resource for which tonnage, grade and mineral content can be estimated based on geological evidence and assumed, but not verified, geological and/or grade continuity."

Indicated resources

> "An Indicated Mineral Resource is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence."

Exploration results

> "Exploration Results (described as 'Exploration Information' in Canada and the US) are estimates which cannot be classified as Mineral Resources or Mineral Reserves. If an entity reports Exploration Results, estimates of tonnage and grade must not be reported. The CIM Standards on Mineral Resources and Mineral Reserves (the 'CIM Standards'), however, do permit such reporting as long as it is clearly stated that such estimates are conceptual or order of magnitude. Similarly, A Guide for Reporting Exploration Information, Mineral Resources and Mineral Reserves (the 'SME Reporting Guide') allows the weighted average grade of specified assay intervals to be reported."

It depends on the amount of drilling

In essence the difference between reserves and resources, and between the various categories of each, relates to the amount of drilling that has been undertaken on a mineral deposit. The closer the spacing between the drill holes the more certain will be the estimates of the deposit's size and ore grade and therefore whether an economic mine can be established.

Resources, a term which incidentally the Securities and Exchange Commission (SEC) in the US does not recognise, are those parts of the orebody which have not been sufficiently drilled for there to be complete confidence on size and grade – measured resources having had more and closer spaced drill holes than inferred resources which may have only been very lightly drilled. It is worth having some familiarity with these definitions as mining companies frequently refer to them, particularly when they are developing a new mine, and annual reports will often contain group reserve and resource tables.

5. Madness in Mining Markets

This section looks at a few examples of the sort of madness that can infect mining share markets. Such events are sometimes loosely described as scams, although often what happens is far more an issue of wild over enthusiasm on the part of investors. However, we start with a genuine scam, and a fairly recent one at that, with plenty of lessons to teach about market navigation - Bre-X and its gold project on Kalimantan.

Bre-X Minerals

The company was incorporated in Canada in 1988. The two key personalities in Bre-X were John Felderhof and David Walsh, the former a geologist and the latter a stockbroker. Both men had been short of money in their early professional years, and in its early days Bre-X seemed infected with the same problem. Interestingly Felderhof and Walsh's first venture together was a trip to the island of Kalimantan in Indonesia some five years before Bre-X was founded. Following its incorporation by Walsh (Felderhof did not become actively involved with the company until 1993) and the initial small scale financings, the company pursued gold prospects in Canada's North West Territories near to the Lupin mine of Echo Bay. When that failed to turn up anything, Bre-X turned to Quebec's Joutel gold area and then in 1992 it was back in the NWT this time chasing diamonds in the wake of BHP/DiaMet.

The background to Busang

Felderhof, who much earlier in his career in the late 60s had, as a field geologist, been part of the OK Tedi discovery, a big copper/gold deposit in Papua New Guinea, was re-contacted by Walsh in 1993 as Bre-X seemed to be heading for extinction. Walsh flew to Indonesia where he and Felderhof went to visit some prospects that Walsh had asked Felderhof to look out for. The approach of Bre-X so far had been unfocussed to say the least, but opportunism is often the driving force in exploration companies and Bre-X's gadfly actions were not abnormal for mining's junior sector. In due course Bre-X acquired the licence to work on the Busang gold prospect, and at this stage things began to get interesting. Busang had first been surface sampled in 1988 by an Australian group called Westralian where interesting values between 6 and 27 grammes of gold per tonne had been assayed. Westralian joint ventured Busang with another Australian company, Montague Gold, who did some shallow drilling on the prospect in 1989. Some reasonable values were found but they were thought to be too inconsistent and the drilling programme was ended.

Bre-X takes off

So it was in 1993 that Bre-X became involved in a discarded gold prospect in Indonesia. Although the company was short of money, personnel were hired including a Philipino exploration manager, Michael de Guzman. De Guzman was experienced, with a good professional reputation and had worked for Benguet, the Philippines gold group, and Australian junior, Pelsart. The further financing, drilling and promoting of Busang by Bre-X was spread over three years between 1993 and 1996. During that period it moved from the tiny, but lively, Alberta Stock Exchange to Toronto's main board. Its price moved from a low of C$0.10 in 1992 to the equivalent of C$330 in late 1996, with various share placements along the way, some of them well below C$5.00. This incredible increase catapulted both Walsh and Felderhof, whose careers and circumstances were at a very low ebb when they went to Kalimantan in 1993, from poverty to enormous wealth.

The problem was that whilst the share price powered ahead, and Walsh, in particular, was promoting the story of a fabulously rich gold deposit at Busang to a very interested public, work at the prospect under the direction of de Guzman was, as we now know, finding only minor traces of gold in the extracted drill core. Despite that, a number of Canadian brokers with experienced mining analysts became enthusiastic followers of the stock. Also over the three years, the developing story, combined with the extraordinary share price performance, attracted several major mining groups, including CRA, Barrick Gold, Placer Dome, and eventually and fatally Freeport McMoran, interested in doing a deal with Bre-X.

Despite the limited drilling done on Busang before Bre-X's involvement, and the unreported lack of success of Bre-X's own drilling programme, the company's promotion of the deposit escalated the size of the gold resource until it appeared to be the largest undeveloped gold mine in the world. In 1993, on the basis of the earlier drilling by Westralian and Montague, David Walsh projected a 20 million tonne orebody with a grade of 2 plus grammes per tonne, mining costs of US$155 per oz of gold recovered to yield a prospective annual cash flow of US$10 million. The grade was unexciting but clearly the expectations were that the ore would be both easy to mine and to treat, which would make the project robustly economic particularly as it would be an open pit operation. The following year the company had increased its Busang resource target to 30 to 60 million tonnes grading over 3 grammes per tonne. That tonnage and grade represented a gold resource of 3 to 6 million ozs. By the middle of 1996, Walsh had raised his Busang target resource figure to 30 million ozs, and later in the year he began to talk about 47 million ozs of gold. Early in 1997, Bre-X raised this resource estimate to 71 million ozs, even as the storm clouds gathered.

By then, attention had turned to the potential of other parts of the Busang lease, and from time to time the company also let drop that other exploration areas in Indonesia and elsewhere in the region were also extremely promising. Bre-X made regular presentations to investors in North America about progress and the potential of Busang. It played host to a number of Canadian brokers on the site itself, although such visits were carefully managed.

The experienced mining consultants, Kilborn Engineering, carried out an audit of work done on Busang which confirmed the prospect's promise. Kilborn remained active on Bre-X to the bitter end, but it is important to understand that though Kilborn were on site at Busang it was their job to see that the work being carried out conformed to expected standards, not to do the work themselves. They expected that the results coming back from the assay laboratories away from the site were correct. On that assumption was Kilborn's support for the project based.

Meanwhile, behind the scenes…

The potential of the deposit was so enormous that not only did Bre-X find itself pursued by major mining groups, the Indonesian Government and the family of President Suharto were also anxious to be involved in the Busang phenomenon. Behind the scenes, as we now know, things were much more fragile. Michael de Guzman had taken to salting the cores before they were delivered to the assay laboratories; *salting* was a technique whereby shavings of outside gold were added to the core to boost the gold values during the assay process. When the results were released the gold grades gave the impression that Busang was a consistent gold orebody with economic gold content. In fact as Westralian and Montague had shown much earlier it was anything but an economic prospect.

The other problem with Busang was that John Felderhof, who was the executive in charge of the operation, was not a natural paperwork man and the status of the Busang lease was sometimes not clear because of this. There were also strange omissions in the drilling work which raised questions, particularly as the area being drilled expanded.

As far as the pursuing mining groups were concerned it seemed that CRA's interest was inflamed by the fact that it had turned its back on Busang when Montague brought it to CRA first. CRA was also prepared to leave Bre-X as a majority holder in the project and undertake to raise all the finance for the project. Its only requirement was that it wanted to do a full due diligence on Busang to confirm Bre-X's work. It was an attractive deal for Bre-X but the company, for reasons that we now understand, was reluctant to agree to CRA's terms.

If Bre-X's attitude to the CRA offering was puzzling so were its discussions with Barrick, the Canadian gold giant. Bre-X wanted Barrick to take an equity stake in Bre-X to secure its short-term funding needs, with a right to back into the venture on a joint basis when a development decision was taken. The Barrick discussions dragged on, with Barrick seeking much tougher joint venture arrangements than CRA had wanted. Around the same time, another Canadian gold giant, Placer Dome, came into the picture. Ultimately Barrick put a joint venture proposal on the table and both parties agreed in principle to proceed, but Barrick needed, like CRA before, to drill a few of its own holes; the data it had been looking at and the samples it had been working on had all been provided by Bre-X. The deal was never consummated as Felderhof refused permission for Barrick to do their own drilling. Placer Dome was next into bat and its keenness led the company ultimately to propose a $6.4 billion merger with Bre-X which would have made David Walsh the largest shareholder in Placer.

Local participation

The Indonesians, unsurprisingly, were as interested as Bre-X in the arrangement because the growing size of Busang meant that a 'new' local participation had to be inserted. Bre-X's two original local partners who had 10% each did not constitute the local interest that would satisfy the authorities. As the joint venture negotiations dragged on, Walsh became increasingly agitated, as did Felderhof, and even the group's camp followers of analysts and investors began to ask the odd pertinent question. It also became clear that Bre-X was going to have to cede a substantial part of the deposit in any joint venture arrangement. The Placer Dome merger partly protected Bre-X shareholders because they exchanged a slice of Busang for a slice of Placer's established gold interests, but the Indonesians did not want the deal, so Placer was forced to withdraw. This let in Freeport McMoran, owner of the Grasberg copper/gold mine situated on the outlying island of Irian Jaya, and a powerful and efficient organisation well known to the Indonesian authorities.

The check holes show insignificant gold

The rest, of course, is history. Freeport's participation was on generous terms; to allow Bre-X to keep a 35% stake Freeport's own stake was just 15%. The

Indonesians, in whatever shape or form, were to have 50%, although Freeport was to be operator of the mine. The stock market did not like the sharp reduction in Bre-X's stake in the project, but it liked even less the announcement in March of 1997 that Freeport had drilled seven check holes alongside Bre-X holes and all of them had insignificant amounts of gold in them. In May, Strathcona, the mining consultants, drilled their own holes on the property auditing Freeport's work. Again the gold shows were insignificant. Strathcona believed that Bre-X had constructed the biggest mining scam in history, the tampering with core samples and the precision of that tampering were unprecedented in their scale and scope. Also during this period, just before the announcement from Freeport of the dud holes, disturbing news had come out that Michael de Guzman, the Busang exploration manager, had fallen to his death from a helicopter. A badly decomposed body had been found in the jungle, it was thought to be de Guzman's. Certainly de Guzman was never seen again after that helicopter ride. The circumstances of his death remain a mystery to this day with some believing he committed suicide, some believing that he had been murdered and others that the body was not his and that he had disappeared. Certainly the bad news from Freeport would have turned the spotlight on de Guzman, if he had lived, as questions began to be asked about the quality of Bre-X's work on the property.

The lessons learnt from Bre-X

The story of Bre-X is complex and complicated, and the potted version above is not intended to be comprehensive. However, it does cover the key points and allows us to draw some conclusions as to how investors should act when faced with a phenomenon like Bre-X. There are, of course, those who would suggest never becoming involved in such speculative situations. But when a share performs as Bre-X did it is difficult not to be drawn in. Also, when some of the biggest mining groups in the world are fighting to negotiate a joint venture, and one of them even proposes a merger almost of equals, it is difficult not to believe that this is the real thing and that a great gold mine is being born.

So what in hindsight were some of the warning signs where the lights were at amber at the very least?

Earlier work suggested caution

The early work done on Busang by Westralian and Montague demonstrated gold on the property but the drilling results also suggested inconsistency in the distribution of the gold. In such circumstances further and more extensive drilling could be carried out, and such work can change the view of the deposit's potential. In the case of Bre-X, its own drilling programme on Busang seemed to show that the previous holders of the lease had quit too early. Nonetheless, the earlier work should have been remembered when the first doubts began to creep in concerning Busang. It is worth recalling that concern about Bre-X, and what it was up to, had been circulating well before the traumatic events of early 1997.

The search for JV partners

Another telling matter was the search for a joint venture partner. Whilst, as has been said above, the number of large companies chasing Bre-X might have appeared reassuring, a look at the tortuous nature of the negotiations, particularly relating to the right of the prospective joint venturers to drill their own holes to check Bre-X's work, should have given cause for thought. No doubt David Walsh, who primarily conducted these negotiations, would have stuck to the line that such work was unnecessary as Bre-X's drilling and the subsequent assaying was above reproach. The point was that Bre-X did not have the management or financial resources to undertake the development of a mine at Busang, so a big partner was essential, and a big partner would want to do their own comprehensive due diligence. To begin with Bre-X's attitude benefited the shareholders in that the share price kept powering ahead as the company issued increasingly bullish results. The number of chasing companies grew as did their enthusiasm to be part of Busang, but Bre-X stood its ground over the issue of check drilling.

The paperwork was in doubt

At the same time the actual status of Bre-X, with regard to the Busang lease and adjoining ground which Bre-X was also drilling, remained unclear. This was particularly dangerous in relation to the Mines Ministry who handled the various work permissions, and the family and associates of the then President Suharto, who was taking a close interest in the giant gold field being uncovered on Kalimantan. The fact was that some of the paperwork relating to the lease was not in order or up-to-date, and this meant that there was a real danger that at any time the Indonesians could have taken Busang away from Bre-X.

Character of the main executives

The two key Bre-X executives, Felderhof and Walsh, might also have provided a clue or two to any sceptical mind. Felderhof, although an important figure in regional geology because of his work on OK Tedi, by all accounts had lived somewhat on the edge financially for a number of years although he was invariably in work. Walsh, the chief promoter within the Bre-X set-up, had also as a stockbroker experienced difficult times, and in Bre-X's early days things became particularly tight. In 1991, Walsh filed for bankruptcy with a mountain of credit card debts and a pending lawsuit from RBC Dominion claiming that he had sold securities that he did not own for his own account some years before when he was working for a subsidiary of the broker. However, Bre-X just survived and Walsh was discharged from bankruptcy in April 1993 in time to steer the company towards Indonesia and Busang.

Insider sales

Perhaps the thing that most haunts those who hung on to their Bre-X shares until the bitter end was the fact that just before the Freeport drilling results were announced, with market rumours circulating that all was not well at Busang following de Guzman's death, the shares had rested for a while around the C$15 level. Although this was almost half the peak level the shares had reached (this following a division of the previously heavyweight shares) it still would have provided substantial profits for many of the earlier buyers. Around this time would also have been a good opportunity to ruminate on the selling of Bre-X shares by John Felderhof who raised many millions of dollars. Walsh also was a big seller, but both retained substantial stakes in Bre-X, perhaps because they believed in Busang, but perhaps because a complete clear-out of their holdings would have been suspicious.

The other fascinating thing about Bre-X was the loyalty that many shareholders displayed even following the Freeport announcement. The death of the project's exploration manager, coupled with a mysterious fire that destroyed all the paper records at Busang just before Freeport started its check drilling, clearly did not dampen the enthusiasm of many. Even some of the brokers following the story believed that de Guzman's death and the fire were coincidences, not evidence of something wrong with the project. The Freeport announcement saw the scales fall from their eyes, but amazingly many others, even as the share price crashed, believed that the problem lay not with Bre-X's work but with Freeport's. This might have flown in the face of logic; Freeport were experienced pros operating the biggest mine in Indonesia, but Bre-X loyalists continued to believe that their geologists and drilling crews really knew Busang, not Freeport, the outsider. They also pointed out that the other mining groups pursuing a Busang joint venture had found gold in the cores they had examined, but these were provided by Bre-X, they were not independently drilled cores.

If ever there was an example of the old maxim of the wish being father to the thought Bre-X was it. It would, however, be unfair not to recognise that holders of Bre-X shares could never have guessed the extent of the scam, its complexity and its audaciousness. The chasing mining giants also provided enormous comfort. As the shares began to weaken in 1997, questions were being asked by some of the company's US investors and the company was not always particularly cooperative when criticism was implied. Cynics wondered whether Bre-X had something to hide, loyalists would have none of it. The change of practice from declaring hole by hole drill results to declaring updated resource figures was also taken on trust, although it looked strange.

Epilogue

During 2003 a revival in interest in mining shares became very apparent as metal prices strengthened and attention began to focus on China, the great new resources consumer and importer. Interest in the sector also began to expand into the more speculative exploration and development shares. As we now know a new mining boom was in the making, perhaps the most promising in decades. Against such a background the days of Bre-X began to fade in the market's memory and new money began to pour in.

Could Bre-X happen again?

So with securities market regulation much intensified since the time of the Bre-X scandal, could another scam be perpetrated this time round on the scale of Bre-X, or indeed on any scale?

The answer to that must be, at the very least, possibly.

The requirements and procedures for making believable and authentic announcements on mineral finds have been in place in Canada, Australia and indeed all the likely mining markets for many years. However, if someone is prepared, for whatever reason, to put his reputation on the line and be less than diligent in verifying exploration results then misleading figures may well get into the public domain. We have seen accountants being duped by such at Enron and WorldCom. Consulting geologists and mining engineers are no less vulnerable, especially if markets are judged hot by unscrupulous or just overexcited promoters.

Investors want to believe

The truth is Bre-X happened because people wanted to believe the story, and they also believed the figures that the company was using had to be correct.

Most of the scams in recent times have taken place in a tough regulatory environment when the perpetrators were fully aware they were committing a criminal offence.

And the blame lies where?

Court action against John Felderhof instigated by the Ontario Securities Commission on the grounds of insider trading (David Walsh died in 1998) started again in 2000 but was suspended after two months, resuming in 2004. After many months of hearings and a period of consideration by the judge stretching to a year, Felderhof was found not guilty in July 2007, the evidence of insider knowledge being judged not compelling enough. The verdict was a surprise to many and it is unlikely that the story ends here. The OSC has itself decided not to appeal the court's judgement but in the wings there is a class action in the US pending, and it is unlikely that that will go away so easily.

There has always been speculation as to how much the key executives, particularly Walsh and Felderhof, knew about the scam, although it is generally accepted that de Guzman was operationally at the centre of it. What can be said is that both Walsh and Felderhof benefited materially from the huge rise in the Bre-X share price and both were enormously bullish about the prospects for Busang based on the figures that de Guzman provided. Did they know the figures were false? We may probably never find out, but it still beggars belief that the two executives carried on pulling the wool over the eyes of some of the world's largest mining companies right until the 'death'. Maybe they carried on in the desperate hope that something would turn up in the end. It may also be that at the beginning Walsh and Felderhof believed they were on to something huge at Busang. When they found out that the whole thing was a scam they were in too deep to go back.

The aftermath

Bre-X, of course, was delisted, everyone ended up with worthless paper, and many with huge losses. Felderhof, who in the wake of the disclosures holed up in the Cayman Islands, eventually had all his assets frozen by the authorities there. He lives now in Australia and visits Indonesia regularly, and he even attended parts of the trial in Toronto though never gave evidence. The mining giants, who so assiduously courted Bre-X, got off lightly and their reputations were not adversely affected, although some like Placer Dome were enormously enthusiastic and furious to lose out to others. It was Freeport who finally brought the party to an end but if any of the other parties courting Bre-X had been able to drill their own holes the party would have ended a lot earlier.

The Australian nickel boom

The events of the late 60s and early 70s in Australia did not of themselves constitute a scam. And the Bre-X like performance of Poseidon, the great stock of the era, was based upon a nickel discovery that eventually became a mine, albeit a not very successful one. Nonetheless the Aussie nickel boom was an event that promised far, far more than it finally delivered. In that process a lot of money was made and then lost, and a lot of money was also raised that often went into promotion and other corporate spending rather than into the ground.

'Closeology'

The Aussie boom also introduced a new generation to that old mining concept of *closeology*. The nickel boom started in Western Australia, heart of the country's historic gold mining industry which at that time was on its last legs. The rundown nature of the state's gold mining industry around Kalgoorlie meant that very little land was held for exploration in the first half of the 60s. Once Western Mining had made its nickel discovery at Kambalda, south of Kalgoorlie, activity started to increase. Because of its historic role as a goldminer in Kalgoorlie, Western Mining held a lot of ground in the area, but further north the ground situation was fairly open. When Poseidon made its nickel discovery at Windarra, 150 miles or so north of Kalgoorlie, it was soon joined by a considerable number of hopefuls who clustered around Poseidon's lease. Many of the companies involved had not been listed when they had pegged their ground; when they did list, their closeness to Poseidon guaranteed a successful float. This *closeology* formed the basis of a lot of the corporate strategy of the Aussie boom.

Similarity with the internet boom

Many of the excesses of the boom related to or were exacerbated by the practices of the time. When Bre-X struck, the whole regulatory climate had been tightened up enormously and this covered everything from stock exchange practices to geological and financial announcements. Communications had also taken a massive step forward when compared to what was around in the late 60s. Bre-X happened despite the much tightened regulatory environment because it was a scam. The character of the Aussie boom had far more in common with the internet boom of the late 90s than with Bre-X. In the Aussie boom investors were for the most part seduced into unrealistic expectations by the prospect of instant riches, a fatal weakness the internet punters also suffered from thirty years later. It is, therefore, easier for investors today to draw obvious lessons from the Aussie boom than from Bre-X.

Just as the frenetic internet boom emerged from the bull market in broad high- tech shares which had developed in the second half of the 90s, so the equally frenetic Poseidon-led boom of 1969-70 had emerged from the developing bull market in Australian mining shares which had been born with Western Mining's nickel discovery at Kambalda in 1966. Amazingly, just over a year later in March 1967, the first ore was produced from the discovery orebody, the Fisher shoot. In this pre-Poseidon period there were two other Western Australian nickel discoveries to encourage investor interest, Nepean (Metals Exploration and Freeport) and Scotia (Great Boulder and North Kalgurli). In Queensland, Metals Exploration and our old friend Freeport were also investigating a large laterite nickel deposit at Greenvale.

Although it was eventually Poseidon which took centre stage as the boom took off vertically in 1969, the previous year saw huge rises for many of the bigger Australian miners such as Peko Wallsend and CRA. Indeed a number of these majors, including Western Mining, reached their boom peaks in 1968 as metal prices led by copper and nickel soared. The previous few years had also been very good ones for mining earnings which provided a sound base for interest in the mining sector. As well as Western Mining and the big miners, the other natural resource area where things were hotting up was oil and gas. It is not in our remit to cover oil but the excitement led by Woodside Lakes Entrance and other oil hopefuls in the late 60s was a curtain raiser for the crazy speculation unleashed by Poseidon.

Poseidon

The blow-off to this highly profitable bull market in mining shares began in mid 1969. The previous year Poseidon, a company with just 2 million shares in issue, had experienced a short-lived surge on the back of some nickel claims it acquired at Bindi Bindi, around 100 miles north of Perth. The shares went from A$0.10 to A$3.45 in a matter of months and then subsided back to A$0.60. New claims at Mount Windarra were acquired, and in early 1969 work started on drilling the prospect. The shares washed above and below the A$1.00 level for a few months. Then in September, as the drilling programme got into full swing and samples began to be delivered to the laboratories of Geomin in Kalgoorlie for assaying, the share price started to move as insiders began to buy.

Insider buying starts

Early in September Poseidon shares traded around the A$0.80 level. By the end of the month the shares had reached A$7.00, with no public announcement having been made. However, internally, Poseidon learnt that the samples being worked on had yielded between 2% and 5% nickel in the core, which had ignited the insider dealing. With grades at Inco's Sudbury, Ontario mine, the world's largest nickel mining operation, below 3% these were good figures.

In early October the company reported that one of the holes at Windarra had assayed 3.17% nickel over 40 feet in massive sulphides. The shares took off and reached A$40 by November, when the next set of drilling results were released. In the early stage there was little London interest in the situation as UK investors continued to follow older favourites like Western Mining, but as September wore on London began to pick up the scent, no doubt encouraged by Poseidon insiders.

New shares issued

Although turnover was very high in the stock, a quarter of the issued capital was traded in just the second half of September; that did not help the financial position of the company, which was tight. To address this problem, and to head off what Poseidon director and the company's chief broker, Norman Shierlaw, perceived as a possible attempt to build a control stake in Poseidon, half a million new shares were issued to six new shareholders at between A$5.00 and A$6.00 – including Canadian junior Conwest and, significantly, London's leading mining broker, James Capel. This placing was to be highly controversial as Poseidon's share price soared.

Through October and into November Poseidon's share price pushed on. In the middle of November, after a new drilling report which expanded the possible size of the Windarra orebody but on the basis of a lower than 3% nickel content, the shares hit A$57.50.

Brokers forecast A$250 per share

At the same time the influence of *closeology* was beginning to make itself felt as new listings like Newmetal and Kia Ora, with leases abutting Poseidon, opened at huge premiums to their offer price. Other stocks were also performing strongly on the back of the developing nickel phenomenon and market volumes were running at unprecedented high levels. Brokers both in London and Australia were beginning to try and calculate a value for Poseidon and, as December opened with Poseidon's shares stuck around the A$50 level, two Australian brokers' reports came out suggesting a value of up to A$250 per share over the medium term. In the second week of December Poseidon reached A$94.

As the Christmas month wound on, stock market activity accelerated, new listings continued to pour in barely satisfying the appetite of investors in Australia and the UK. Tips also began to multiply, with both London and Australian newspapers besieged by investors trying to get their favourite stocks into the financial pages. By the third week of December Poseidon had breached A$100 and hit A$121 before falling back.

On the 19th December Poseidon, with exquisite timing, held its AGM in Adelaide. The meeting was packed in marked contrast to the previous year when hardly a shareholder turned up; some shareholders had crossed the globe from London to be present. There was an attempt by some shareholders to get the September placement reversed but they were defeated. Then Poseidon's Chairman announced that on the basis of up-to-date drilling the company had a major mine in the offing with a resource (as we would now have to call it) of 4 million tonnes grading 2.4% nickel. The market was encouraged and the shares finished the trading day at A$130.

On the 23rd December the shares soared, closing at A$175. On Christmas Eve the market was open for only half a day but volume was huge in both Australia and London, and Poseidon closed for the holiday break at A$182. However, the star turn that amazing day was not Poseidon, but one of its associates, North Flinders, which in time became one of Australia's most respected gold miners in a later boom. Flinders had taken 100,000 Poseidon shares in the earlier controversial placing. Just before the AGM, which saw its Poseidon placing confirmed, the shares had stood at A$2.35, when Christmas Eve trading in London closed the shares had reached the sterling equivalent of A$22.

Poseidon finally peaked at A$280, before crashing back to earth

By New Year's Eve Poseidon had pushed on to an amazing A$210. But the boom was near to its end, and ahead of that some of the mining leaders opened 1970 in retreat. For Poseidon the game was not quite over. January proved another good month and intra-day Poseidon touched A$280, around £122 in London, ahead of the release of the London broker Panmure Gordon's note on the company putting a value of A$382 on the shares. That proved to be its peak and by the end of the year the shares had sunk as low as A$39. Before that, in mid year, the shares had slumped to A$64, a fall of three quarters, but over the northern summer they actually doubled to A$144 before crashing again to hit the December low.

Whilst a mine was eventually developed at Windarra, poor management saw a number of excellent opportunities to finance the mine on reasonable terms passed over. A number of problems hurt Poseidon, not least of all the fact that its reluctance to enter into a joint venture with a nickel user like Amax of the US meant that the company missed the nickel price boom. It came to production in 1974 in the middle of the mid 70s economic slump when mining investors were almost entirely focused on gold.

The post-mortem

Looking back, perhaps, as with all great speculative blow-offs, not enough attention was paid to possible unwelcome facts, one of which was that no later drill result from Windarra matched the figure of 3.17% nickel first reported in early October. Indeed, three years earlier Western Mining was regularly pulling 3% results from its Kambalda drilling to the delight of the market. This meant that potential production was being overestimated in the very forward looking forecasts being provided by the broking community. The nickel price was also being overestimated, the record high level reached in 1968 at the height of industrial action at Inco's Sudbury complex was often used as the long-term price level; it did not achieve that level again until the late 80s. There was also the issue of mining costs, and few, if any, analysts foresaw the great inflation of the 70s. After the October announcement further results in hindsight were disappointing, a fact that the powerful Sydney broking company, Patrick and Co, realised early in 1970. They sold large amounts of Poseidon stock down to A$200, much of it to London. Ironically by 1975 Patrick had gone bust, forced into liquidation by property investment problems and the collapse of the Mineral Securities group, which we will touch on later.

For those interested, a comprehensive history of the nickel boom has been written by Australian journalist, Trevor Sykes, called *The Money Miners* which covers events in the sort of detail which this book cannot go into. Before I conclude the snapshot of the boom with a comment on Mineral Securities I want to touch on three other events to add further flesh to the story of 1969-70.

Tasminex

One of the most unusual price explosions was that of a stock called Tasminex. The company had a lease at Mount Venn in Western Australia which it had begun to drill in late January of 1970 as the great boom began to stutter. It had floated the previous October, like Poseidon, with 2 million shares issued at A$0.25; and by late January it had reached A$3.50. On the 27th of the month its price suddenly jumped to A$18.50. Then sensationally the next day, following the publication of a interview with the company Chairman, Bill Singline, who said that Tasminex had struck massive sulphides in its drilling, the price in London surged to the equivalent of A$96. Singline also rather rashly was quoted as saying that the find could be bigger than that of Poseidon, which accounted for much of the euphoria.

‘Massive sulphides’ found

The story which was splashed all over the early editions of the London evening press stated massive sulphides had been found, a classic example of a little knowledge being a dangerous thing. Massive sulphides are to be found in a number of geological settings and essentially are a homogeneous structure of compounds where sulphur is found combined with one or more metals. The discovery of massive sulphides in no way guarantees an economic mineral deposit, although at the height of the Aussie boom the word massive to the untutored eye had a real excitement about it. The high grade section of Poseidon's first reported hole at Windarra had also been in massive sulphides. The London story on Tasminex also reported that the hole had been drilled from an outside latrine on the property which was further inducement for the London papers to give the story prominence.

In essence the Tasminex story was a scam but not deliberate as Bre-X was. In a report prepared for the Tasmanian Attorney-General (Tasminex was incorporated in Tasmania) in 1970 by a local lawyer J.W. Wilson, the main thrust of the criticisms of the affair was the misleading and grossly overoptimistic statements coming from the company and a large amount of privileged insider trading in the shares. There was no salting of the concentrated samples panned by one of the Tasminex geologists, they had little nickel in them when they were finally assayed. However, unwarranted claims were made about the geological promise of the prospect and fed into a crazed market that would believe almost anything it was told.

Unsurprisingly, Tasminex shares fell back from A$96 and in early March traded at A$7.50.

Surprisingly, Tasminex was one of the few hot stocks of the nickel boom to actually develop a mine, a small tungsten mine in Tasmania which opened in 1978. However, by 1985 Tasminex had been de-listed from the Australian Stock Exchange; it had lasted longer than the original Poseidon NL which was de-listed in 1976 after appointing a receiver two years after the Windarra mine opened.

Endurance Mining

The boom itself was topped and tailed by two stories that more obviously were scams, and both were officially investigated and labelled as such. The first, Endurance Mining, interestingly was, like Tasminex, a Tasmanian company and a small tin miner who had even managed to pay dividends in the past. It had a tiny number of shares in issue, around 190,000, and in 1968 in its somnolent state traded at close to its par of A$0.50. In pursuit of a listed vehicle to inject mining properties into, a group of primarily mainland investors, including corporate dealers, brokers and geologists, bought out a number of long suffering and willing Endurance shareholders representing 43% of the issued capital for around A$0.73 per share.

The main aim of the new shareholders, who had acquired a public vehicle very cheaply, was to start to generate interest in Endurance through the new projects that would be injected into the company. They also expected to be able to make considerable amounts of money as inside traders of their shares. New capital was raised by way of a funding to provide working capital for Endurance's new activities. To begin with, however, a reconstituted board concentrated on the company's traditional area of interest, tin, and a small Tasmanian tin reserve was acquired from BHP. After gaining control of Endurance the new board had also divided the share capital into A$0.25 par value shares on a 2 for 1 basis and the subsequent capital raising had been done on the basis of 3 for 1 at A$0.10. The original group of new shareholders then had 8 Endurance shares for an overall outlay of just over A$0.13 per share (A$0.73 + 6 x A$0.10).

A JV with Attunga Mining

The events that followed eventually became the subject of an investigation by the Attorney-General of New South Wales. One of Endurance's new shareholders, Paul Murray a corporate dealer, was familiar with a scheelite (tungsten) deposit in New South Wales held by a near insolvent private company called Attunga Mining. Attunga had been drilling its prospect at depth during 1968 and had recorded two holes with interesting results:

- Hole 1: reported in late October, averaged 0.86% tungstic oxide over 412 feet, and
- Hole 2: reported rather later in mid December, averaged 1.44% tungstic ore over 600 feet.

Before the second hole was released Endurance signed a joint venture agreement with Attunga; its shares were trading at A$0.80 at the time, having been as high as A$3.00 in August when rumours first started to circulate about a deal with Attunga. Attunga's parlous financial state was not known at that stage.

Speculation about the Attunga prospect drove Endurance's shares higher in December and they hit A$5.00 around Christmas, reaching a peak of A$10.60 at the start of 1969. The excitement over Endurance was further helped by the company's listing on the Sydney Stock Exchange and news that senior miner Peko Wallsend, who already had an operating scheelite mine in Tasmania, was preparing a bid for the Attunga prospect. Peko stepped back but continued to monitor the project and in February Endurance made an all share offer for Attunga, effectively rolling its sound balance sheet into Attunga's weak one. At the same time it announced that reserves at Attunga were now 500,000 tons of 1.4% tungstic oxide.

Ore grades prove disappointing

Interestingly around the same time a geologist from North Broken Hill had visited Attunga and reported back that he thought the reserve figure was around 650,000 tons of 1% tungstic oxide, a little bit more ore but a much lower grade than the company's own figures. NBH stated that the deposit might be economic but it was too small to interest a major, a comment that could well explain the cooling of Peko's interest.

From then on it was all downhill with the major problem a poor result from the third hole at Attunga released in mid February which showed tungstic ore grades of less than 0.1%. Field geologists had also noted a high molybdenum content in Attunga's scheelite ore which could have created treatment problems without potentially costly separation. A substantial increase in Endurance's issued capital as a result of the Attunga takeover and the poor drilling result helped to push the share price down to A$7.50. Doubts were also being expressed internally about the rich second hole, a situation made worse by the fact that communication between Endurance and Attunga was poor.

By August the shares were below A$1.00 as a result of a boardroom battle in June between the Attunga interests and the original new management, after which the latter resigned. Following these resignations there was a flurry of selling which came from both the resigning management and the new Attunga directors. However, it was later discovered that insider selling had started a good bit earlier when doubts about the accuracy of hole 2 began to circulate internally.

The investigation afterwards unearthed that Endurance had sent their geologist to Attunga to check the split core from hole 2 on site and see if he thought that there could be a problem with the assays from the half of the core sent to the laboratory. He reported that reserves were only 220,000 tons averaging 0.35% tungstic oxide, a figure well below both Attunga's earlier bullish calculation and well below even NBH's independent assessment.

A huge scam

In the end it was calculated that insider selling resulted in an aggregate capital gain to the insiders of over A$5 million, and this in less than a year. For those days, over thirty years ago, it was a huge sum which in purchasing power probably exceeded the profit taken by Bre-X insiders as their scam fell apart. Fortunately for the market the Endurance farce happened when investors were still bullish and they were able to move on to other things, and since it was now 1969, that meant Poseidon.

Leopold Minerals

Investors in Leopold Minerals were less lucky because that situation unfolded the other side of the boom. In early 1971, Leopold shares stood at A$0.50 having been floated the previous year to exploit some uranium leases at Nullagine in Western Australia. The start of the year had seen the mining market in sharp retreat in the wake of the failure of the mighty Mineral Securities (with whose story I will end this review of the Aussie nickel boom).

Leopold's story is quickly told. Almost as if someone had been preparing the scam, Leopold's shares doubled in the first three months of 1971 to around A$1.00, despite a continuing fall in the value of Australian mining shares which had accelerated in the final quarter of 1970.

In mid March, out of the blue, the company announced that it had struck 5.22% nickel over 25 feet of drill hole, a result that exceeded anything that Poseidon had reported and reminded some investors of the early days of the boom back in 1966 when Western Mining announced extremely rich assays from its Kambalda discovery. If the boom was by then pretty much over, the Leopold 'discovery' was able to generate three trading days of excitement, pushing the shares up from A$1.00 to a high of A$8.80 before the company's Chairman asked for trading to be suspended. Both the Perth Stock Exchange and the company's brokers, Constable & Co, were concerned and sought more information from Leopold about the rich value of the nickel core.

State and national authorities instigated enquiries into the Leopold situation, and one of the company's directors, Brian Cutler, was eventually arrested, tried and sentenced to 3.5 years in prison for criminal deception. Leopold redrilled the discovery hole, as all the original core had either been pulverised or lost, and the ensuing results showed little or no nickel in the new core. The original results had clearly been tampered with, probably by salting the core. Brian Cutler had made over a quarter of a million dollars trading the shares following the original drilling announcement, and though he denied any wrongdoing, the trial jury found him guilty. Soon after Leopold came the Agnew discovery of Selection Trust and CAST, but though there was considerable interest in the situation, the bounce had gone out of the market and the boom was finally over.

Mineral Securities

Any review of the 1966-70 Australian mining boom cannot conclude without saying something about the nascent mining finance house, Mineral Securities (Minsec) which was formed in 1965, publicly listed in 1967 and declared insolvent in 1971. The company was formed by geologist Ken McMahon with the aim of using its initial capital to invest and trade in mining shares, directing the profits made into long-term mining projects. The long term intention was to build a new Australian mining finance house to act as a counter weight to the powerful overseas mining operators in Australia like RTZ. Ironically though, McMahon found little local support for his patriotic venture in the early stages, and almost 60% of the initial capital was raised from overseas investors.

Huge trading volumes

Minsec's timing could not have been better. The oil boom was in full flow and Western Mining's discovery was just around the corner. Also, the background of strong metal prices and mining earnings, a result of rapid economic growth in the US and the acceleration of US spending on the Vietnam War, perfectly complemented Minsec's strategy. In its first year, 1965-66, Minsec made A$21,000 from share trading. In the year it floated, 1967-68, helped by the consequent increase in capital, the company's share trading profits reached A$1.89 million, and in the year before it collapsed, 1969-70, those trading profits had exploded to A$12.4 million. Although in the course of its short life Minsec accumulated long-term control stakes in a number of Australian mining companies, it was the scope of its share trading which made it a market giant. Indeed in 1970, its last year before insolvency, the total value of shares traded by Minsec reached A$154 million. This compared with the figure of A$48 million for the same year reported by AMP, by far and away Australia's largest life assurance company. Minsec's trading volumes based on issued capital, borrowings and group deposits were so great that every broker and bank wanted to do business with this Australian phenomenon.

The structure of Minsec divided into long-term investments, which gave it control of a number of promising mining projects, and its short-term trading investment book, the value of which could seesaw between almost nothing and several millions. For most of the period between 1965 and 1969, the group was heavily exposed to the bull market on its trading book. Also over the period it built up control stakes in a number of companies including Cudgen RZ (mineral sands), Aberfoyle (tin), Invincible Life & General Insurance, Equity Funds of Australia, Petroleum Securities Australia, Pexa Oil and Amad (mineral exploration). But though Minsec's business seemed broadly based, if in hindsight rather speculative, its massive share trading profits in 1969-70 were very narrowly based around Poseidon, although they topped off their rich run in early 1970 by turning a A$1 million profit in just one trade in Tasminex. That was as good as it got, and Poseidon was to be a major element in the group's failure when Minsec, having shrewdly got its trading portfolio down to almost nothing by the end of January 1970, plunged back into the market in June and into Poseidon which rallied over 100% to A$145, having fallen from A$282 to A$64 in less than four months. By December Poseidon had crashed back to A$39 and Minsec had lost around A$3 million from its re-entry into the market.

The build up of long-term investments

Turning to the long term side of Minsec's investment strategy, 1970 also saw the group make three major investments that within a year proved its undoing – Robe River, Kathleen Investments/Queensland Mines and Theiss Holdings. As it rebuilt its trading portfolio Minsec was gearing up massively to expand its long-term investment holdings. It participated in the flotation of Robe River, the Western Australian iron ore project with Cleveland Cliffs of the US, a mine with a low grade of ore that was generally considered far less desirable than high grade operations such as Hamersley and Mount Newman. Following the flotation Minsec had between 40% and 50% of Robe River and it was very active in the market both as a trader of Robe shares and as a long-term buyer. By the end of 1970 it held around 50% of Robe River which had cost it A$28 million.

The Nabarlek uranium deposit

Whilst this was a very big commitment for Minsec the group was also busy on other fronts, principally buying control of the potentially huge Nabarlek uranium deposit whose discovery was announced in July by Queensland Mines. Queensland Mines in its turn was controlled by Kathleen Investments who also controlled Mary Kathleen, at that time Australia's only operating uranium mine. Queensland Mines also owned the promising uranium prospect at Westmoreland in Queensland state. Nabarlek, however, was in a different class, or so it seemed at the time, and in September Queensland Mines stunned the market by announcing that the Nabarlek deposit contained 55,000 tons of uranium oxide grading 540lbs per ton. This was a huge uranium discovery by any standards and Queensland shares soared from A$7.20 in August to A$46 in early October. The share price movement was further stimulated by the fact, as in so many cases during the Aussie boom, that the number of issued shares in Queensland Mines was low, around 5 million.

Using top brokers, Patrick Partners, Minsec bought both Queensland and Kathleen shares, the former primarily for trading and the latter for control purposes as Kathleen held just over 50% of Queensland Mines. Unbeknownst to Minsec the September 'indicated reserves' estimate of 55,000 tons was not made on the basis of drill holes but was more an educated guess on the part of Queensland and Kathleen Chairman, Roy Hudson and senior geologist Emile Rod. Within a month, as Queensland shares peaked at A$46, drill results were received from the laboratory which did not support the reserve figure postulated. These results were kept under wraps for a further year. When they were finally released they indicated a far more modest uranium potential at Nabarlek. But by then the boom was truly over, and the mine eventually developed at Nabarlek by Queensland Mines was a disappointing performer and was closed in 1988.

As for Minsec, it built up its holdings in Kathleen, and in Queensland, at considerable cost and it had to borrow short term to fund its purchases. It also began to buy coalminer Theiss with the aim of injecting its long term energy holdings into a new Patrick supported vehicle called Power Resources of Australia (PRA). In this way Minsec would recoup at least part of the purchase cost of these investments and it would then be in a position to repay the borrowings which had swollen to A$80 million by the end of 1970.

These loans were largely collateralised against Minsec's long-term investments which for most of its short life had risen year on year. Unfortunately for Minsec with the boom at an end and the fabulous Nabarlek story tarnished by a rising tide of facts, cover for the huge borrowings had evaporated. Also, both the market and the lending institutions had begun to worry about some of Minsec's accounting practices, particularly the large profit it had made on its initial Robe River subscription shares. Desperate to bolster its 1969-70 profit figure it washed this holding through a wholly owned subsidiary and tried to book it as a trading profit. Eventually it had to reverse the transaction and a healthy profit turned into a loss. The flotation of PRA got stuck and promises of more permanent capital to alleviate Minsec's heavy short-term borrowing position never came to fruition. In February 1971 Minsec was declared insolvent.

Intriguingly the name Mineral Securities (Minsec) lives on in the form of a new Australian mining investment group listed in 2004 but unconnected to the original company. Despite that, the new Minsec acknowledges that its aim to build a global resource investment vehicle was inspired by the original Mineral Securities strategy, but it intends to avoid the errors that brought its predecessor down!

The bear market scuppered any rescue plan

Serious attempts were made to construct a rescue plan for Minsec, but in a bear market environment the strategy that had worked so well in a bull market was fatally flawed. The expansion of its activities in 1970 could not have been worse timed, but that of course is a hindsight view. At that time the boom had been going since 1966 and the Poseidon blow off had not been recognised as the end of the bull market. Minsec's view was that the growth of the Australian mining industry was set to continue as new mineral discoveries were made, and its strategy of aggressive expansion would eventually make it the country's leading mining group. The size of its borrowings and the fact that some of its key assets, particularly its Nabarlek holdings, were grossly overvalued meant that its demise was very likely even though a lot of people stood to suffer, perhaps fatally, if Minsec did go under.

One of the largest associates of Minsec to collapse was Patrick Partners, which was severely wounded by its indirect participation in Nabarlek through its house mining trust, Castlereagh Securities, and expired in 1975.

We have concentrated on just a few of the stocks and situations that made the Aussie nickel boom. Those who participated in the excitement may well have their own memories of stocks that they followed. There were many to follow and many good stories that I do not have the space to go into here. Amongst this litany could be included International Mining, Carr Boyd Minerals, Westralian Nickel, Great Boulder/North Kalgurli, VAM, Hampton Areas, Westmoreland Minerals and North Deborah. There were many more and most of the stocks have long since disappeared but a few soldiered on, living to fight another day. More particularly ten years later companies like North Kalgurli and Carr Boyd participated modestly but profitably in the 1979-80 gold boomlet.

Not a global boom

One of the things that makes the Australian mining boom unusual, certainly in today's global market, is the fact that despite the huge gains to be made the boom did not attract worldwide participation, in marked contrast to the recent high-tech/internet boom with which it shares a number of often startling similarities. The main participants in terms of portfolio investors were Australian and British. There was some interest from the Continent, particularly Switzerland, and also some from the Middle. The problem was that exchange controls of some sort or another were fairly widespread. The UK had some flexibility as the Sterling Area was still, just, operative and technically UK investors did not have to purchase investment dollars at a premium to buy Australian securities, as they did if they wanted to buy US shares for example. The authorities did have an informal agreement with UK institutional investors that they would refrain from putting additional money into Australian shares above the level of their holdings in 1969. Although they were able to trade and utilise capital gains on these historic holdings.

The impact of British capital gains tax

Because British participation was so high the market also had to grapple with the consequences of the UK's capital gains tax regime. Here there were two classes of capital gains, short term (made in under a year) and long term (over a year). Short term gains were taxed at the individual's top personal tax rate which in the late 60s reached in certain extraordinary circumstances over 100% and averaged for higher rate payers over 80%. Long term gains, however, were taxed at a much more reasonable rate of 30%. The upshot was that investors often felt compelled to hold on to shares where they had made good profits in the hope that they could realise those capital gains at the lower tax rate after a year. This inevitably meant that liquidity in the market, particularly where the stock was a UK favourite, was poor and share prices were often boosted by UK reluctance to sell. It could, therefore, be said that in many shares a quasi false market existed as the price was partly influenced by this reluctance. If more Australian investors had realised the significance of the UK situation the market might not have developed quite the froth that it did. Time and confidentiality preclude a clear answer, and maybe the dates are not quite right, but could it have been the Poseidon stock of UK holders, freed from punitive tax rates in 1970, that Patrick Partners was selling as Mineral Securities was buying in 1970? Certainly more attention should have been paid to the issue of delayed profit taking by UK investors.

However, even allowing for UK CGT distortions, there is no doubt that the Aussie mining boom was a genuine event as was the internet boom thirty years later. Interestingly the lessons that one could have learned from the Aussie boom could have been applied to the internet boom, with great benefit to those investors prepared to draw the parallels and act accordingly. However, when the global mining team at Paribas tried to draw comparisons between the two booms in their December mining review of 1999 all comparisons in the piece were edited out. The suggestion was that, with plenty of corporate IPO business planned by the firm in the high-tech/internet sector in 2000, it would not do to suggest that the high-tech boom could have the unhappy ending that the Aussie boom had. Nonetheless the point here is that the broad structure of a stock market boom regularly repeats itself, not only over time in the same sector but also across sectors.

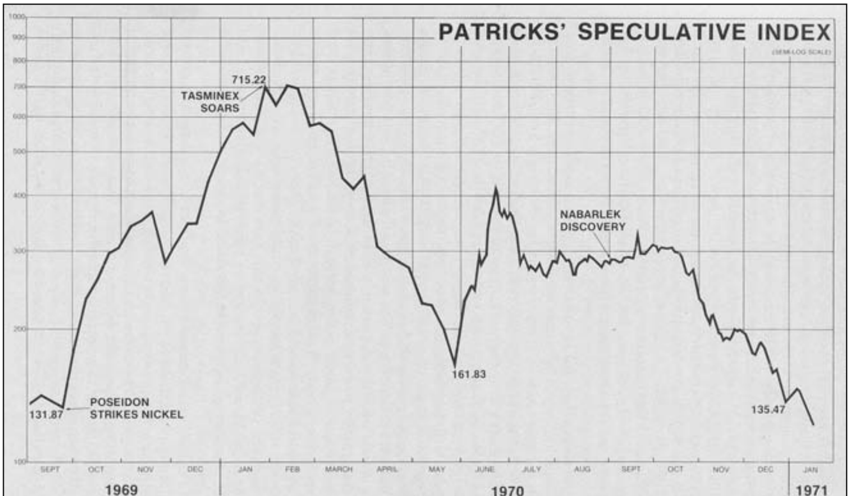
Lessons from the Aussie boom

Few companies survived

One of the main lessons coming out of the Aussie boom was how few of the new exploration companies ultimately survived, largely, of course, because so few of them actually found economic mineral deposits that could be turned into long-term mines. Western Mining was one that did find a major new mine, and indeed in the ensuing years has developed other new mines, but it was very much in the minority. Quite a few companies, although mere shadows of what they had been, soldiered on into the 80s but most eventually died.

In hindsight it is easy to see that the nightmare spike on a chart of a company's share price is signalling the final blow-off at the end of a market boom. There were plenty of such chart shapes in 1969 as the boom peaked. In the thick of the sort of excitement seen in 1969, investors are prone to believe that any pull back is the prelude to another stomach churning surge in the share price. As happened with Poseidon in mid-1970, a rally often does take place but it soon runs out of steam and the downward drop resumes. It also helps to know how broad based activity is in a share, the mid-1970 Poseidon rally was largely a function of Minsec's return to the market as a short term trader anxious to boost trading profits ahead of its ambitious corporate expansion.

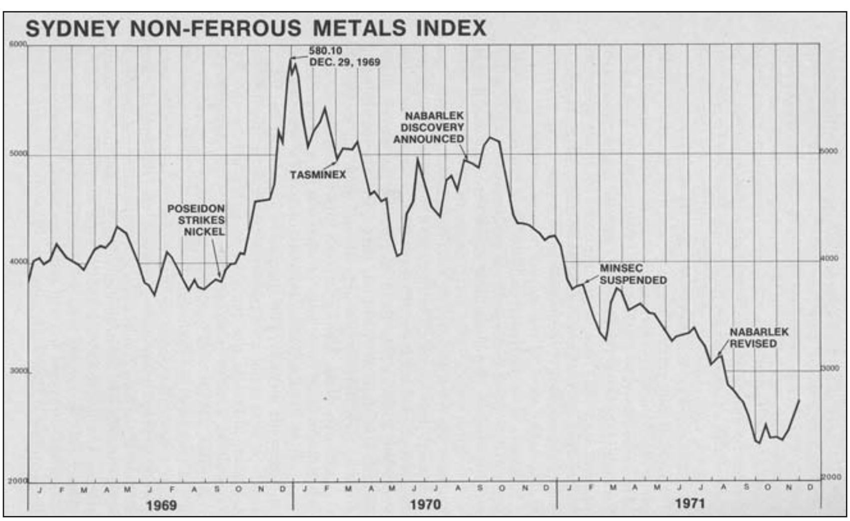
Chart 5.1 Patrick's Speculative Index 1969/71



This is Patricks' Speculative Index, probably the best single chart of the boom. It was based on the market capitalisation of 30 stocks, which were changed from time to time but never included Poseidon or Tasminex. Peak capitalisation was $715.22 million on January 28, 1970. — Tasminex's big day. Dividend-paying miners were excluded. It peaks slightly later than the Sydney Stock Exchange's non-ferrous metals index, also shown here.

Source: *The Money Miners*, Trevor Sykes

Chart 5.2 Sydney Non-Ferrous Metals Index 1969/71



Source: *The Money Miners*, Trevor Sykes

Since the Aussie boom had effectively been going since 1966, the sudden rash of new flotations in 1969, the people involved, and the philosophy of *closeology* apparent in many of the listing documents, can now be seen as the inevitable gathering of the latecomers for the final act of the drama. This was what happened with the Canadian diamond boom in the early 90s, and active but short-term participation in the final stages of that boom as the flotation of junior hopefuls gathered momentum would have delivered a stream of trading profits during 1993. Only a very few stocks, most particularly DiaMet, could have been held for long term profits. In that sense DiaMet occupied the same role as Western Mining did in the nickel boom.

Another feature of the boom was the way that as things began to hot up non-mining companies began to take stakes in new exploration joint ventures. One example was the participation of Laporte, the UK chemical company. Also, a number of small listed industrial companies in Australia decided to abandon their traditional businesses and re-invent themselves as mineral exploration companies. After acquiring some leases they then raised funds on the stock exchange.

This changing of the spots is a feature of runaway stock market booms, and not just in mining, and can be an early signal that the boom may be entering its last and often its most violent leg.

Take profits early

Another lesson that the Australian boom taught was that to take a quick profit might lead to frustration at making too early a departure from a situation, but in the longer term that could well turn out to have been the right thing to do when the particular stock collapsed with the boom. Holders of Poseidon who saw the shares up to, say, A$10 in the third quarter of 1969 and got out, might have been feeling awful when the shares were closing on A$300 only a few months later. When the shares were de-listed in 1976 they would have felt a great deal better, and though Poseidon was re-listed two years later as a gold producer it was a literal shadow of its former self. One of the tricks of participation in boom markets is to take profits but stay in the game. The Aussie boom should have been seen as a very well run bus route and the participating shares as the bus fleet – if you miss a bus or get off, there will always be another one to catch just a few minutes behind.

Another of the old investment dictums – if it's too good to be true it probably isn't – is particularly apt advice for mining booms. If investors had regularly sold on drilling news during the nickel boom and moved on, they would have captured a large slice of the upside and been strategically re-positioned for the next *exciting* situation. As mentioned before, very few small mining companies achieve the elevated status of giant; the Aussie boom threw up Western Mining but nobody else.

The last word

Perhaps one of the most intriguing stories of the Poseidon boom was of the shop girl working in Harrods in London in late 1969 who was run to ground by the UK popular press. She owned 2,000 Poseidon shares bought as a fun punt over a year before on the advice of her boyfriend when the shares stood at around 6d in old money (2.5p today). Her capital gains problems, if she had sold having held the shares for more than a year, would have been confined to paying the standard 30% CGT rate, high but not punitive. History does not relate what happened to her holding, worth around £200,000 then, or more than £2 million in today's money, but, perhaps unfairly, one would have to surmise the worst.

That sort of rags to riches opportunity is one of the most compelling aspects of trading the mining share market. It is, therefore, intriguing that over the last few years the metal that propelled the Aussie boom, nickel, has risen spectacularly on the back of excellent long-term fundamentals. Equally intriguing has been the discovery of very high grade nickel over the last two or three years by Australian junior Independence Group in Western Australia. Independence acquired a couple of ageing nickel mines and associated exploration land from Western Mining in the Kambalda area where the Aussie boom started in 1966. The results that Independence has announced have included very rich drill holes grading between 3% and 10% nickel, much of it underlying the original Western Mining orebodies. Such results throw up the possibility that much, much more nickel than was outlined in the exploration boom and after in the Kambalda area has still to be uncovered. In mining, lightning often does strike twice in the same place.

Mining projects that refuse to die

Strong mining markets, if sustained, have a way of encouraging old projects to be dusted down, looked at and if worthy of further promotion they can be repackaged and refinanced. Faced with these kind of investment possibilities, the best thing is probably to run a mile. But if a lot of time has passed since the dusted-down project was last in the news it may be able to be refinanced by investors who do not know the original story.

The example of Tenke Fungurume in the Congo

An example of this is the huge copper/cobalt deposit, Tenke Fungurume, in the Congo (DRC). In the 60s it was the prime development project of Charter Consolidated, which was then the international mining arm of Anglo American. Eventually, due to chronic political problems in then Zaire and a weak copper price, Charter dropped the project. It remained dormant until the 90s when, with the fall of President Mobuto, foreign interest in mineral development in the region began to revive. A Canadian company, Tenke Mining, then negotiated the old Tenke Fungurume lease with the new Kabila government in the DRC and started work on a feasibility study of the old deposit. Unfortunately civil war broke out in 1998 and in the following year Tenke stopped work on the project. Its share price which had been as high as C$22 in late 1997 slumped to below C$1.00 in mid 1999 when it suspended work on the project. Since then there has been a gradual improvement in the situation in the DRC and in 2003 Phelps Dodge (now part of the Freeport McMoran group) took an effective 57.75% interest in the project, with Tenke Mining having 24.75% and the state mining company, Gecomines, having 17.5%. The feasibility study has been completed and production is planned to start in the second half of 2008, more than forty years late!

Southern African offshore diamonds also hold a perennial fascination

Another example of the perennial mining comeback story is the southern African offshore diamond saga. In the early 60s Texan entrepreneur, Sam Collins, backed his judgement that huge quantities of diamonds had washed down the Orange River and accumulated over millennia in the offshore waters of South Africa and Namibia (then South West Africa) and started an ocean diamond mining company, Marine Diamonds (MDC). His earlier efforts led to some spectacular production success, but it was short-lived and in the end a combination of patchy, and thus uneconomic, production and operating problems led to the demise of the Sam Collins diamond effort. However, De Beers, who had taken a stake in MDC, believed in the long-term possibilities for offshore diamonds and effectively took over the Namibian operation. Over the years De Beers (now called Namdeb in Namibia) has improved the technology of ocean mining, and the combination of this with a strong US dollar diamond price trend and a weak SA rand/Namibian $ has led to a material expansion in ocean diamond production.

In the late 70s improving prospects for diamonds and some technological advances led to a revival of interest in offshore diamonds. Ivan Prinsep, a very different type of entrepreneur to Sam Collins, being half and half Anglo-Russian, entered the scene using very basic hose and pump techniques in an initially successful operation in South African waters. His company, Dawn Diamonds, however, ran into trouble and got involved in a messy legal fight with its controlling shareholder, Theron Holdings, after the latter had tried to acquire Trans Hex, another diamond miner. Eventually Theron went bust in 1983 and Dawn Diamonds was broken up. Prinsep bitten by the offshore bug formed and floated another company, Ocean Diamond Mining (ODM), that same year. Others also slowly entered the offshore hunt including Trans Hex, Benco and two Canadian companies, COEC and NAMCO. The late 80s were difficult times for offshore diamonds but ODM kept its head above water and also survived the poor mid 90s diamond market.

With an improvement in the diamond market in 1995 and with investors' appetites for the sector whetted by the discoveries in Canada, interest in offshore southern Africa began to rise again. As the millennium dawned NAMCO, who had taken offshore technology beyond the hose and pump stage and were using an undersea crawler, became the new star of offshore mining. But perhaps the sector is fated, for NAMCO, who had taken over ODM along with its more traditional hose and pump operations, suddenly hit trouble. Its crawler crashed into the sea when it was being winched down to the seabed and was lost. So was the company, and despite desperate efforts to raise rescue capital NAMCO went under. Its operations and assets were purchased by Russian diamond czar Lev Leviev. Currently Leviev, Namdeb and Trans Hex are the main players in offshore mining, but adding together the parts of the offshore waters of both South Africa and Namibia where Orange River-borne diamonds could have been deposited we are talking about thousands of square miles of potential. It would be surprising if in due course we did not see new players trying to join the offshore hunt; hope as we have shown springs eternal in the cold waters of the south Atlantic.

Other projects that have been through more than one owner and still not made it to production include the Musongati nickel prospect in Burundi, the Petaquilla copper prospect in Panama and the Lady Loretta zinc prospect in Australia. The Las Cristinas gold project in Venezuela is another example, and here the volatile Chavez government seems likely to nationalise it after more than twenty years of on-off ownership and development planning. Interestingly a new flotation on AIM, Energybuild, listed in August 2007 raising capital to expand its coal operations in South Wales, once one of the most important coal mining areas in the world. There are many more dormant projects, picked up, dropped and then picked up again as the metals cycle waxes and wanes. The projects can also change name from time to time which makes them difficult to identify when the time to re-promote them rolls round again. The usual reason for this re-promotion is that often the problem that first (or even second) time around scuppered development plans has been dealt with making the project attractive again. This can take the form of:

- a **higher metal price** that may push the project back into economic territory,
- it might be that earlier metallurgical problems have been overcome through **technological advance**, or
- that **political restraints** (often a big issue in Africa) have been alleviated by a change of regime.

Always look closely at the history of any project

If an investor is not familiar with the history of the project being promoted he may well not be able to ascertain easily if he is looking at a well-worn mining prospect that has been around undeveloped for a long time. One of the most obvious clues is if the project comes with a substantial resource already identified. Whilst this is not conclusive evidence it does warn any investor that he ought to look closely at the project's provenance before doing anything. Of course in these days of privatisation a resource figure may simply mean that previously there had been work done of a non-commercial nature, perhaps as part of an overseas aid package, and the prospect is being farmed out by the local government for the first time.

However, if further investigation does reveal that the project has been around a long time and defied earlier attempts to develop it commercially, the chances are that a new attempt will also fail. Of course, as alluded to previously in respect of mining shares as trading opportunities, the fact that the project is unlikely to make it to the mine stage is not a reason to ignore the shares as a trading situation as long as you have your eyes fully open. If macro and micro economic conditions are right and the new management intelligent and/or aggressive the shares may perform very well for a while, but profit taking sooner or later is advisable.

The Comeback Kids

And it is not only old projects that get dusted down and recycled, mining entrepreneurs/promoters also have a habit of staging comebacks. For obvious legal reasons this book cannot 'name and shame' the promoters who constantly reinvent themselves, usually for their personal benefit and not the benefit of those who provide the capital. Needless to say investors should check out every promoter, as well as every project, they run into, a task made considerably easier these days by the internet.

One interesting candidate for an AIM listing which surfaced in 2007 was Philippines copper miner, Atlas Consolidated, which had been something of a London favourite back in the 70s. A much higher copper price had clearly encouraged it to re-establish contact with old friends in London.

As a final word it is interesting to learn that, following his recent acquittal on charges of insider trading, Bre-X 'legend' John Felderhof continues to claim that there is gold at the notorious Busang prospect! It will be a major top-of-the-market bell ringing exercise if someone dusts down Busang and trots it around again!

scripophily.net

There is a US run website that is worth looking at from the point of view of historical perspective – www.scripophily.net. Its business is the sale of old-style share certificates of companies long since gone, and many of the certificates are almost works of art. The site primarily, but not solely, offers US certificates for sale. One of its largest sections is the one covering mining and gold mining shares, and the stock Scriophily has to offer is beautifully laid out and the site provides a large amount of information on the companies whose certificates are offered for sale. Whilst a fascinating site in its own right, it also provides a genuinely interesting historical record of an important segment of the mining industry. And who knows, amongst the long dead operations and companies represented by the now defunct share certificates on sale could lurk a potential project, for as the old saying goes the best place to find a new mine is where there used to be an old one.

6. Dealing & Settlement

On the face of it dealing in mining shares should boil down to assessing what service levels an investor is looking for from a broker and how cheaply they can be obtained. Some investors might think that because mining is often seen as a non-core sector it may be difficult and even expensive to invest in.

In fact dealing in global mining shares is not particularly difficult, and dealing in UK mining stocks and settling the trades should present no problems. Even in foreign markets I would argue that difficulties are often exaggerated. The US is a market that most London brokers should deal in without argument, although their expenses for so doing might vary quite significantly. The other main mining markets – Australia, Canada and South Africa – can be more complicated but not for those who know what they are doing. Online brokers, offering a dealing service level only, are an option for the large markets and since most brokers automatically register foreign shares, particularly US shares, in their nominees not in the investor's name, it might make sense to find an online broker who will deal cheaply in the main mining markets as a long stop for the investor's main conventional broker.

Dealing in a foreign currency

In such a global sector as mining, some investors may be worried about dealing in different currencies if they venture outside the UK. This is unnecessary as all stock broking firms should have access to cheap and competitive foreign exchange dealing services. So if an order is given, say, in a Canadian mining share in the Toronto market it should be straightforward to convert the consideration into sterling for crediting or debiting the client's account. A good broker will be able to mitigate a fair proportion of the inevitable transaction costs by obtaining competitive rates, in some contrast to the investor's experience as a tourist where he can be skinned alive by the foreign exchange bureaux.

Some investors might like to open a foreign currency account if they trade frequently overseas, and most brokers should be able to do this without difficulty. However, it is not really necessary for the average investor and there would almost certainly be administrative costs in running such an account.

Dealing in the UK

The actual mechanics of dealing in the big FTSE100 UK mining shares and the middle range UK or foreign AIM-listed mining stocks, and settling the trades, should represent no problem.

Own name, nominee and CREST accounts

One issue is whether the investor wants personal registration so that he can be in direct contact with the company or whether he is prepared to accept registration in his broker's nominee name. Part of the decision relates to how the investor keeps in touch with his investment, a subject we will come on to a little later. However, many investors in the UK these days no longer have their shares registered in their own names but have been persuaded to use their broker's nominee service, or some have personal CREST (the London Stock Exchange settlement system) membership which is sponsored by their broker.

Personal CREST membership means that you are registered with each UK company you own shares in, and receive all corporate communications, dividends, etc. directly, but the account is an electronic one without certificates or the need for transfer forms. You can also hold some foreign shares through CREST but these will be held in the name of the broker who sponsors your CREST membership and not directly in your name. Currently in the UK discussions are going on to create a paperless settlement system where investors, who want to hold shares in their own names, will no longer receive certificates as proof of ownership but will instead receive accounts from the relevant registrar. The idea seems very similar to the Australian Chess system which we discuss later.

Investors directed towards FTSE100 stocks

As a broad investment principle UK brokers, hampered by compliance and regulatory issues, increasingly try to direct their clients into stocks in the FTSE100, and are often reluctant to recommend going for smaller stocks, or foreign stocks outside the main markets of the US, Japan and Europe. Because of this they may well try to direct clients interested in mining into the big easy-to-deal-in mining stocks in the FTSE100 rather than a foreign mining stock.

If you know what you want to do, stick to your guns and deal in the stock of your choice. So if you want to buy a South African gold share or a Canadian copper share, for example, and you want pure exposure, don't be persuaded into a diversified like Anglo American or Rio Tinto just to please your broker.

Dealing on AIM or the domestic market

There is, however, an issue to be faced when dealing in mining shares listed on AIM, for some of them remain incorporated in their country of origin and have retained a listing, often the primary one, in their home market.

These shares are often Australian, although there are Canadian stocks now on AIM. It is quite possible that a broker with an order in an AIM listed Australian mining company will try and transact it in London which will be cheaper, and certainly easier, for him if not for the client. The problem for the investor is that very probably the London market, if the stock is an Australian one which because of the time difference means that the Australian market is closed, will offer to deal on a wider spread than would be the case in Australia, and in a smaller volume also. In this situation it usually pays to ignore the London market and have the order placed in the Australian market for execution the following day. The price and volume are likely to be better than would have been achieved in London. Of course because of unexpected news or market movements it might be that waiting will lead to a less satisfactory outcome, but in my experience that is a rare occurrence, and the reverse may even be the case. The other downside of buying AIM rather than foreign register stock is that UK stamp duty is charged on UK register purchases.

There is one anomaly between AIM and the Canadian market that is worth bearing in mind, particularly where the Canadian company is placing stock with UK investors. If a Canadian company places Canadian register stock, under Canadian market rules it is usual for there to be a hold period where the new holder is not allowed to sell his stock to Canadian registered investors, and the period can vary between a few weeks and a year. The stock so placed will carry a legend to this effect and will not be accepted for good delivery in the Canadian market until the hold period is over. There is no such limitation in the UK market where UK register stock is involved, although investors as part of the placing agreement may pledge not to sell their shares for an agreed period. This is, however, in the way of an informal arrangement and is not part of UK market regulations. Therefore if a Canadian company uses its AIM quotation to place stock outside Canada there is no formal hold period attached to the placing. Some UK and Continental investors refuse to participate in placings where there is a formal hold period, so an AIM listing may well make it easier for a Canadian company to raise money in the UK and Europe if it places UK register stock.

Dealing in non-UK markets

Australia

Australia is also noted for its paperless settlement system (CHESS); when you deal there is no certificate to receive or send in and no transfer form to sign. UK brokers try and steer their clients towards nominee registration so that the client no longer has any paper to deal with (save for filing the contract note), and the broker's settlement department takes over sole responsibility for settling the bargain. In Australia companies sponsor registration of their shareholders with their registrars. When a shareholder deals he receives a statement and a shareholder number and if he sells, or buys more stock in the company, he merely informs his broker of his account details and on settlement a book entry changing the shareholder register is made by the registrar. No paper has to be signed or sent by the shareholder. The system is simple to understand, efficient and allows the shareholder to remain registered directly with the company.

Perhaps because they have little Australian business some London brokers find the simplicity of the CHESS approach slightly off-putting and have been known to try and complicate the process by issuing transfer forms to be signed by shareholders, which rather negates the advantages of CHESS.

South Africa

The South African market also has a paperless, or dematerialised as they call it, system (STRATE) but it is more complicated than the Australian system, and investors dealing in South African stocks may because of this choose to hold their stocks in their broker's nominees. This unfortunately will result in paying additional overseas annual holding charges, as indeed does using the broker's nominees for US and other foreign stocks. Ironically two major South African gold shares, AngloGold and Durban Deep, have Australian shareholder registers due to acquisitions and therefore can be traded in Australia and settled using the CHESS system.

The problem with South Africa is that under the dematerialised system personal registration is still possible and certificates can still be issued, but before you deal the certificates must be dematerialised by submitting them to the Johannesburg stock exchange for the holding to be recorded electronically. Once that is done (it should take two or three days) the stock can then be sold. If the certificate is coming from the UK then several days need to be added to the dematerialisation process. In the STRATE system South African investors now register with Central Securities Depository

Participants (CSDPs) either in that CSDP's nominee name or in their own name, depending on which CSDP they are using. Unfortunately the system at the moment is complicated for foreign shareholders and they are probably better off using their own broker's nominees.

There are a couple of ways round this for UK investors. In the past most South African mining companies set up London registers for use by UK and other foreign shareholders. This meant that investors could deal in the London market, with the trades generally taking place between foreign brokers and investors in sterling. The trade was then settled in London with no need for stock to travel to Johannesburg, although if there was a price difference between London and Johannesburg it was (and still is) open to the broker to deliver London stock to Johannesburg. In due course dealing in London became more expensive for large investors due to stamp duty and commission rates and they began to use Johannesburg or ADRs (American depository receipts) in New York. Although many South Africans retain London registers, many market makers and traders are reluctant to participate in London register trades, largely as a result of the shrinking number of such trades. However, UK and South African registers are completely fungible so dealers can unwind London trades in Johannesburg. The time needed to deliver London stock to Johannesburg to be dematerialised and then delivered to the Johannesburg market is around two weeks against the three day settlement time allowed in the STRATE system. If this is the case brokers may insist the shares are dematerialised before they will place an order in the market.

Having said that, some brokers in London will still deal in UK or SA certificated South African stock before the shares have been dematerialised for delivery to the Johannesburg market. They get round the delivery time problem by borrowing stock in South Africa to fulfil the three day settlement requirement; in due course the stock from London is delivered in Johannesburg and dematerialised and the borrowed stock is returned. The expenses of doing the trade this way are rolled into the price that the investor in London receives if he is selling. Buying is not quite such a problem but investors may find that their brokers and/or the market makers will dictate how the stock is delivered and therefore the manner in which its ownership is registered.

The effective restrictions on SA dealing in terms of available options is in some contrast to the situation for UK investors thirty years ago when the London broking community had few problems in dealing in SA mining shares. It is particularly ironic that in the post-apartheid era, dealing in South African shares in London has become something that many brokers are reluctant to encourage, although some of the big investment banks have SA subsidiaries. In the 70s every London broker of substance had both advisory and dealing competence in South African shares. It is the same story in Australian shares, although there are still a good number of Australian brokers with London offices which makes it slightly easier for London brokers without agents on the ground in Australia to place orders, as they can use these offices to transact client business. Although, as mentioned above, price and size may be less satisfactory this way.

North America

Dealing in the US and Canadian markets should pose few problems. These days virtually all dealing for UK investors in these markets is done by their broker through that broker's agent (either a US broker in New York or a Canadian broker in Toronto) in the local market where price and size are more competitive. A few UK investors have opened dealing accounts with the London office of a US broker; such an arrangement is more than likely to use an online account. It is also open to an investor to approach a North America broker to deal through the local office. The main reason for this is that US broker commissions for private clients are lower than UK rates. Although both the US and Canadian markets deal in registered stock, which means that an investor could have stock registered in his name, stock is usually registered in a nominee name and held to the dealing broker's account which, of course, incurs a charge. It is also in this age of mining sector takeovers on a global scale worth mentioning that registered shareholders in a UK company taken over by a North American miner are likely to receive registered scrip from the buyer. This happened when AIM listed Brancote was taken over by Canada's Meridian. Whilst some UK brokers have difficulties with selling registered North American shares, the process is not that complicated and any shareholder should be able to insist on an immediate transaction.

It is possible to buy many of the non-North American mining stocks in the US in the form of ADRs as mentioned above, and many larger institutional investors do so. In effect ADRs are bundled receipts representing registered stock already in existence and issued in receipt form by a US custodian. One of the snags is that some investors will effectively suffer two management charges as a result of the ADRs; firstly being held to the account of his broker and secondly because his broker will normally pass on the US custodian charge to him.

China

The specific issue of China's raw material needs and its strategy to secure them is dealt with elsewhere. Here, our interest is in the investment opportunities in Chinese incorporated mining stocks.

Dealing in stocks that are listed in China in the appropriate form should not present an insurmountable problem, although it is likely that smaller London brokers will use an agent to transact client orders, to settle the business and to hold the stock once it is delivered. How much a sceptical investor might trust the process we cannot judge, but obviously there will be many who will be nervous of such exotic transactions and will find buying UK or Canadian China-orientated companies less stressful.

One of the earlier Chinese miners to list overseas was Zijin Mining, a gold company quoted on the Hong Kong stock exchange. Yanzhou Coal, headquartered in Hong Kong, also has a listing on the New York Stock Exchange. There are a growing number of other companies as I have already mentioned, and Jinchuan Group, a large nickel/cobalt/PGMs producer with interests in Zambia as well as China, is an example of one Chinese mining company preparing an IPO in 2008.

Our interest is in the issue of whether, now that the number of Chinese incorporated mining companies listed and listing is expanding, investors can have confidence in the credibility and robustness of the Chinese stock exchanges and their investor protection regulations. There is also the question of the quality of corporate governance in China, which encompasses also the circulation of news to shareholders in a timely fashion, and here doubts have been expressed by outsiders. However, helpfully most listed Chinese companies, including the leading miners, have website information in English as well as Chinese. Dealing in Chinese stocks at this stage in the development of Shanghai's capital markets is best left to institutions as the markets still have the flavour of the wild west about them.

Miscellaneous dealing vehicles

In the main this book is aimed at investors who are interested in the mining sector and who would deal conventionally in mining shares to gain exposure to the mining sector. However, there are number of other derivative vehicles that can be used to get exposure to the sector, namely:

- Spread betting
- CFDs
- Futures
- Traded options
- Covered warrants

Most of the above share similar characteristics, such as leverage, the ability to go short and tax advantages. In general, they are more suitable for short-term trading rather than long-term investing.

Spread betting

Almost exclusively a feature of the UK market, as they benefit from a UK law that classifies spread betting as gambling, and hence exempt from capital gains tax. It is also exempt from stamp duty. This is a very active market, with prices made on all UK stocks (down to a market capitalisation of approximately £30 million – depending on the spread betting firm), and also on foreign stocks including mining stocks in US, Canada, South Africa and Australia.

CFDs

Similar to single stock futures, or stock margin trading, they are off-exchange vehicles that, in the UK, do not attract stamp duty. The markets in the UK and Australia are very active, and they are just launching in some European markets, but are not authorised in the US. They cover a very wide range of stocks.

Futures

Single stock futures have been available in the US and UK for a few years, but have failed to take off. In the UK, they tend to be available only on the large capitalised FTSE100 and international stocks.

Traded options

In the UK the spread of stocks with traded options is quite limited. The mining stocks available are Anglo American, BHP Billiton and Rio Tinto; the premiums charged in order to take out positions are also quite high. As with covered warrants, the popularity of traded options in the UK market has been undermined by the popularity of CFDs and spread betting.

The situation as regards choice and costs is slightly different outside the UK. In the US there is a wide choice of traded options and the main US mining stocks like Newmont and Freeport McMoran have options. The Canadian traded options market centred on Montreal is also limited, with some mining stocks included but only a few juniors. In Australia the story is much the same, some mining traded options but mainly the bigger companies.

Covered warrants

Covered warrants are similar to long-term options, but they cannot be written – puts and calls can only be bought from (and then sold back to) a bank offering them. As with (long) traded options, the attraction of covered warrants is that they offer limited downside with no danger of margin calls. They are usually listed on an exchange. They have been popular in some European markets, but less so in the UK. Their coverage is not wide, but the banks can be quite inventive in creating novel covered warrants offering exposure not easily available elsewhere.

Don't forget that many mining stocks are highly geared investments already

However, if an investor is tempted to leverage his mining market strategy it will require nerve so they ought not to forget that this can be done within the conventional share market by buying high beta stocks. So if you fancy the copper price you don't have to buy a Rio Tinto CFD, with its open ended liability exposure, to massage your performance – our old friends the Zambian copper twins ZCI and ZCCM, and their straight ordinary shares will do the job just as well, and your risk is confined to the original purchase consideration and the country of operation.

The role of the stockbroker

I have made a number of general comments in other parts of the book about stockbrokers. Since an investor is bound to use the services of a stockbroker somewhere along the transaction path, a few dedicated comments are appropriate here.

Does the broker have mining experience?

If an investor already has a personal broker he will know whether that broker has any mining sector expertise, or whether there is anyone in the firm who knows anything about the sector. If the answer is no, then the investor is on his own unless he thinks it worthwhile to find a more knowledgeable broker to act for him. He, of course, has to work out whether his interest in mining shares is likely over the whole economic cycle to be substantial and persistent, thus making the switching of brokers worthwhile. He could simply take just his mining business to another broker, but it would probably need to be substantial for this to be sensible.

Stockbrokers as a source of information

Earlier, we observed a developing trend among brokers to try and direct clients into large marketable stocks and away from smaller and thus possibly more speculative companies. This does mean that brokers, for compliance and regulatory reasons, may be reluctant to offer advice in an unfamiliar area like mining. But as we shall see in the next section there are other sources of information for investors looking at the sector, and these are perhaps more reliable, fuller and, what's more, available on tap. Of course some investors value the support and participation of their broker in what they do, and do look to him or her to alert them to events affecting their portfolio. In a fast-moving sector like mining such support is obviously helpful in keeping the investor in touch, although many brokers (in the UK and in other countries) may be hard-pressed to keep up with such a fast-moving sector with its strong foreign news flow. If the broker does not have any expertise in the mining area and cannot, therefore, help in this way, or indeed simply cannot find the time, it is not the end of the world as the investor can these days do the research himself thanks to the internet.

The importance of dealing expertise

However, an investor's minimum requirement must be that his broker be able to instruct the firm's dealers correctly so that any dealings in mining shares are carried out efficiently and in the appropriate market with regard to dealing size, settlement costs and holding expenses. Previously we have looked at the issue of dealing and settlement in the mining sector in some detail, and believe that any competent broking firm should be able to transact business in foreign markets without a major problem. If they cannot, or say they cannot, then a prudent investor will obviously need to look for another broker to carry out mining orders.

7. Information Sources

Above we have deliberately, in talking about dealing, laid some stress on the options available to a shareholder in how his ownership is registered. The reason for this relates to the importance we lay on having access to timely information in a sector where things can change very quickly. Broadly, an investor/shareholder has four main sources of information that he can use:

1. press and specialist press,
2. the company itself,
3. the internet, and
4. his stockbroker.

Media

In the past the mining sector was well served in the UK by newspapers and investment magazines. There were also a number of specialist mining publications, some of which survive to this day. However, coverage of mining in the financial pages of UK daily and Sunday newspapers today is often confined to the activities of the FTSE100 mining leaders, and the contraction in the space for broader based mining stories and comment in the *Financial Times* over the years is typical of the trend.

FT

Thirty years ago the *FT* had two regular mining columns – the Lodestar comment piece on Mondays written by Leslie Parker, the highly respected mining journalist, and a Saturday sector review piece written by Ken Marston. During the week there was also a daily mining news column covering a wide range of mining company issues including financial results, exploration news and other corporate activity. Eventually the Monday column, on Leslie Parker's retirement in 1978, was dropped and this was followed by the dropping of the Saturday review in 1987, following the retirement of Ken Marston. The special news column was also dropped in 1987 and mining news was either dispersed around the relevant company news pages or found in a new page that covered all commodity news including London and New York commodity prices.

In due course commodities were reduced to half a page and then reduced further to the bottom corner of a page, and the full metal price service, which included overnight New York metal prices, was also dropped from the newspaper at the same time, although it continues to be available on the *FT*'s website! The extensive London commodity prices review table, which appeared in the Saturday/weekend edition, has been reduced over the years and now simply extends the short and edited daily price list. Mining company news stories are now confined to the UK or overseas company pages and are much reduced in number and increasingly are background comment rather than news-orientated. The limited number of pages in the newspaper available for financial news and the growing coverage of foreign companies (but seldom mining) means space is squeezed, typically in a 21 page companies news section 11 pages will be taken up with prices, of which 8 are for managed funds.

In 2003 the FT had no review or comment on Rio Tinto's interim results and in 2006 there was no coverage (certainly in the last edition of the paper) of Antofagasta's interim results! Also, despite the excitement concerning the uranium price over the last couple of years the FT has had no comment on Cameco, one of the world's largest uranium miners, since 1999, and this despite the huge problems being experienced by its massive Cigar Lake project.

Stories, particularly relating to foreign mining companies, are prone to be replaced in the *FT*'s final UK edition, which is often the one distributed in London and the Home Counties. Other UK newspapers are even less interested in mining, and comment here is usually confined to the big UK Footsie mining companies. In the last few years there has been an increase in the number of mining companies who have a quote on the *FT* prices page for the LSE main and AIM markets, although the heights reached thirty years ago have yet to be regained. In the 70s and 80s around 180 companies had an *FT* quote, today there are around 35 mining companies listed on the main market FT prices page and 110 or so in the FT's list of AIM mining companies. Several other miners have for some reason ended up in a Basic Resources (ex-Mining) category adrift from their peers and seemingly unable to be moved despite pleas to the FTSE bureaucracy whose instructions the *FT* follows to the letter.

Neither Leslie Parker nor Ken Marston would have stood for that!

Other magazines

A number of UK magazines covering finance/saving and stock market activities, including the *Investors Chronicle* and *Shares*, do review mining shares from time to time, but coverage is sporadic and fairly basic. Amongst the specialist mining press in the UK there is the *Mining Journal*, *Metal Bulletin, Commodities Now, World Mining Stocks* and *World Gold,* which provide a comprehensive view of the metals and mining industry. Since an annual subscription to *Mining Journal* is roughly the same cost as a year's *FT*, investors might consider the *MJ* in the light of its comprehensive mining sector coverage. There are also specialist mining publications in mining countries like Canada and Australia – the *Northern Miner* in Canada is one of the most widely read. Others include *Resource World*, *Canadian Miner, Mining Review* and *The Prospector* from Canada, and Australia's *Paydirt, Resource Stocks* and *Gold Mining Journal*. There is also *Mining Review Africa* published in South Africa. Overseas publications like the Northern Miner are relatively easy to subscribe to, but they will always reach UK readers a few days after publication in their home country. Although, increasingly publications can be obtained online which gets round this problem.

Company investor relations

If a shareholder is registered in his own name then the company will communicate directly, although the flow of information is likely to be confined to annual reports and published results, the latter often arriving some weeks after their public release.

Companies are obliged to publish a substantial stream of news these days, partly as a result of stock exchange requirements regarding price sensitive information, but this news does not have to be communicated directly to shareholders, only released to the relevant stock exchange.

In the UK a shareholder could access this information through Financial Express (www.investegate.co.uk), which is the premier source of UK company announcements, and has a page dedicated to mining stocks.

Company websites

Most companies have websites and news of this nature and more besides should be found on it. All of the big mining companies have extensive websites, as do many of the smaller companies. The problem is that keeping track of this tide of information can be hugely time-consuming, although a system of news alerts can be put in place to sieve at least some of this news flow. Also, many mining companies invite investors to subscribe (almost always free) to receive news communications by e-mail, which is particularly useful when following overseas companies.

Mining company websites in general have been designed by specialist organisations whose expertise lies in design rather than the activities of the client company. Therefore corporate websites tend to cover the same broad categories as each other and a mining company website, although it will carry information specific to it and its industry, will not look much different to that of other public companies seeking to communicate with their shareholders.

The essential information that a potential investor will be after about the company's operations and its information releases are most likely to be found on pages with titles like:

- Operations
- Projects
- Press releases/news
- Investor information
- Results and news

The title of these information pages does differ from site to site so a little experimentation will probably be necessary. There is usually a *contact us* page which can have names of the corporate officers and group addresses with phone/fax and e-mail contact details. The site may also have either a dedicated section or a site within a site where copies of the *annual reports* and *interim announcements* can be downloaded. The process of downloading and then printing can be time-consuming, but then that is a general comment on using the internet as an information source.

Annual reports and the FT

An alternative to downloading company reports from the internet is to get them delivered free by post through the FT Annual Reports Service. They can be ordered by phone or fax through the *FT* which carries the relevant contact numbers at the bottom of the UK share prices page, and quite a few UK mining companies are part of the scheme.

They can also be ordered online at www.harriman-house.com/annualreports

A list of mining companies whose annual reports can be ordered through this service is given in the Appendix.

Internet

On the internet there are a number of free-to-use mining news sites: Mineweb and Minesite are two of the better known ones and offer comprehensive coverage of the sector and often perceptive editorial comment. Gold bugs are also very well catered for online. In some cases there is a requirement to register for these services before access is granted.

Using these kinds of information sources does mean that a lot of sifting of the news is done for investors, and the expert interpretation of stories can also be helpful.

The internet is a very powerful information tool and it makes it fairly straightforward to follow developing mining stories. In the following table are a number of the available mining and metals information sites. Two things must be noted however. Firstly, the list is not meant to be comprehensive and there are certainly far more sites available than are listed here. Secondly, some of the sites are free to view and browse, others are wholly subscription services and others are part-free and part-subscription. This situation is a fluid one and so I have not specifically marked the particular status of the sites on the list. What I will say is that at the time of writing four of the most informative and interesting sites are:

- Mineweb
- Minesite
- Gold Eagle
- Kitco

Table 7.1 Mining related web sites

Web site	Service
www.321gold.com	Gold, financial news
www.freebuck.com	General financial news and gold
www.goldcolony.com	Metal and mining company news
www.gold-eagle.com	Gold and precious metal news and comment
www.goldensextant.com	Gold, financial sector comment and opinion
www.goldseek.com	Gold, financial news and comment
www.howestreet.com	General financial news with mining bias
www.infomine.com	Global mining news
www.investmentrarities.com	Precious metals trading and comment
www.jsmineset.com	Gold news and opinion
www.kitco.com	Gold and precious metal news and prices
www.lemetropolecafe.com	Gold and gold share comment and opinion
www.minebox.com	Australian based mining news
www.mineralstox.com	Precious/base metal and mining news
www.minersmanual.com	Mining information with precious metals slant
www.minesite.com	General mining news and comment
www.mineweb.com	Full mining news for all markets
www.mininglife.com	General mining news and reference
www.miningmx.com	Global mining coverage
www.resourceinvestor.com	General mining news
www.sharelynx.com	Precious metals news and comment
www.silver-investor.com	Silver news and comment
www.silverseek.com	Silver and financial news and comment
www.thebulliondesk.com	Precious metals news and comment

Stockbrokers

We looked at the general role of the stockbroker a little earlier. However, in the context of the provision of information the last source would be an investor's own stockbroker.

In today's markets where the influence of stockbrokers' compliance departments is often considerable and where asset allocation is organised centrally leading to an official list of recommended stocks, private client stockbrokers will often confine themselves to the FTSE100 miners. Their knowledge of overseas markets is often sketchy and they will therefore be reluctant to offer advice in the area of overseas listed mining stocks. The compliance issue will also in many cases drive their attitude to AIM listed miners, this speculative area requiring considerable care in terms of advice.

This, of course, was not always so and the Aussie boom and the following South African gold share boom were two peiods when London private client stockbrokers often had a reasonably good grasp of the mining sector, and with industrial equities out of favour they were only too happy to advise their clients on mining shares. That situation no longer holds sway and private client stockbrokers in particular prefer to play it safe when offering investment advice. A few private client stockbroking firms have recently acquired mining research expertise, and after a long period of attrition we are beginning to see the bigger investment banks start to add on or expand existing mining equity coverage and sales. One interesting example of new interest in the mining sector has been the arrival in London of Mirabaud Securities – an institutional agency stockbroking offshoot of the eponymous Swiss private bank; one of the firm's key specialisations is mining.

A reasonably comprehensive list of brokers interested in mining can be found at *minesite.com* under *service companies*, *stockbrokers* and *nominated advisors*. It is, however, important to realise that many smaller brokers are only interested in mining as a source of fees from listing and funding work, and few provide resources for research and client servicing. It is therefore quite likely that individual investors will have a better idea than their stockbrokers where to go for mining sector information, and may also be better able to interpret and act on what they uncover.

Four examples of UK private client-orientated brokers who research the mining sector are Numis Securities, Seymour Pierce, WH Ireland and Keith Bayley Rogers. It has to be remembered though that smaller brokers who have research departments, and coverage of specialist sectors like mining, probably have institutional/corporate ambitions and therefore have not put mining research efforts in place primarily to support their private investment business. In these cases, private clients of these firms will still have to direct any enquiries on the mining sector to their designated broker, and hope that he or she has a good relationship with the research department. It is also not certain that ordinary private clients would be able to receive the mining research product ‘legally’; as these days FSA rules direct that professional research can only be distributed to competent investors – institutional and qualifying experienced private investors as defined. Clearly, dealing through a broking firm that does have some specialist mining experience is better than using a firm with absolutely no expertise, but expect a far more uncertain welcome to your business than would have been the case 35 years ago at the height of the ubiquitous Aussie boom.

8. Ten Key Points

I want to distil what we have learnt about the mining sector into ten points to keep in mind whenever we think about investing in the mining sector. Some of the base principles are also applicable to other stock market sectors.

1. Stripped down to bare essentials, mining shares are often like the proverbial tin of sardines – for trading but never for eating – so **always take profits**.
2. The sector is **irretrievably cyclical** – for example, the Zambian copper twins (ZCI and ZCCM) historically experience bull market rises of between 10 and 20 times, and in bear markets lose more than 90% of their value.
3. Many mining companies are formed but **only a handful survive for any length of time** to earn profits and pay dividends, and only once in a blue moon does one of these become a giant.
4. A **flow of information** and a good understanding of its importance or otherwise is essential.
5. Before you place a mining sector order be sure you are absolutely clear what should happen in terms of **dealing** (the required stock and the best market to deal in) because your broker may well not know.
6. Always check the **provenance of 'exciting' mining stories** and/or excitable mining promoters to make sure that you're not being sold a retread.
7. Always be aware of the underlying **macroeconomic situation** as it affects metal demand and prices when you are thinking of investing in the mining share sector.
8. Mining bull markets often develop very slowly but **spike very quickly** and the ensuing bear market retreat can also be very fast.

9. Mining shares often **bottom out well before the metals cycle turns up**.
10. **Never fall in love with a mining share**, it will invariably jilt you in the end.

Many of the above points may seem obvious to readers, indeed some of them may even appear rather mundane. That may well be, but the points are listed as they are in my view absolutely essential if potential investors are going to participate profitably in the mining share sector.

I cannot reiterate enough that the mining share sector is endemically cyclical, and these cycles are usually unpredictable in terms of how long they last and the extent of price movements in both directions. The current mining bull market, which began in 2002/3, will be no different from past bull markets, despite the fact that many think it will run for years due to its alleged supercycle nature. It may well run for a long time, but it will end as all past mining booms have ended, and very probably messily too. The theme for investors then must be one of setting price targets and of taking profits. Anyone coming new to the game and thinking, as many of us did in our youth when playing the Aussie nickel boom, that they have stumbled upon a money-making machine with an infinite life would be repeating mistakes made in all past stock market booms when the new paradigm argument was put forward to support continued participation in the action.

In the main, mining shares really are like the proverbial can of sardines. If you don't grasp that, the sector will provide you with nothing but tears. But if you do grasp that, you will have opened up the prospect of being able to make money in the stock market even when all but the mining sector is in ragged and painful retreat.

Conclusion

At the end of this trip through the mining sector it is now time to try and draw some, hopefully, useful conclusions from what has been written. In particular we have sought to be persuasive on whether mining, especially gold mining, deserves a core position in any portfolio.

Mining is regaining lost ground

Although the FTSE100 in the UK includes four of the largest mining companies in the world, the sector still does not receive the acclaim that it enjoyed thirty years ago, when in rapid succession the Australian nickel boom and the South African gold boom captured the imagination of private and institutional investors, and saved the bacon of UK brokers at a time when other markets were almost moribund. In the ensuing years other sectors have pushed past mining and at one stage in the 90s it was frankly shunned by all but the irrepressibly optimistic. Today in the UK, FTSE100 tracker funds have to have an exposure to what is now a large mining representation in the index, although one still senses caution in the funds themselves as evidenced by the relatively low ratings of the mining leaders. Even in mining countries like Australia and Canada, investors no longer see mining as the key investment area it once was. Having said that, the China demand story has had an impact in terms of recapturing some of the attention the sector enjoyed thirty years ago and this may gather momentum.

This book has set out to explain both the rewards and the pitfalls of investing in mining shares and in doing that has also tried to promote the idea of mining as a core sector. Our main thesis has been that gold in particular often has a negative correlation to the movement of ordinary industrial equities, and because of that, gold shares can usefully improve the performance of a general portfolio when equity markets are in retreat.

Cyclicality is an important characteristic of mining stocks

I have mixed history with contemporary events to draw conclusions about the all-important issue of securing the profits that investors make in mining, an issue not exclusive to this sector. The problem is that mining is highly cyclical and when it is running strongly investors have a tendency to forget that when the sector reverses, capital gains can melt away quickly, sometimes alarmingly so, which explains why we often refer, in terms of comparison, to the infamous internet boom. This cyclicality is so well established that, unless the investor has stumbled upon the once in a lifetime mining junior heading for immortality and a seat at the mining giants' table, he ignores it at his peril.

One of the problems facing the smaller investor is that he often sees the mining sector as providing the sort of volatility that can make him rich quickly, and he is not wrong in so thinking. The snag here is that many investors are looking for the multiple times share price rise that turns a modest sum of money into something altogether more serious, a perfectly acceptable 40% profit would not be enough. To elaborate, if an investor puts, say, £2,000 into a mining share then such a 40% rise would lead to an increase in his capital to £2,800. Satisfactory, but unlikely to change his life. If he puts in £20,000, a similar 40% profit would see his capital rise to a nice £28,000.

One doesn't have to rely on ten-baggers to get rich

However, if we were in the middle of a mining boom and the investor was able to reap a 40% profit every two months and re-invest, then after two years the £2,000 investor would find his capital had grown to a very acceptable £112,000. To achieve this he would have had to be lucky enough to find 12 situations where quick profits could be made, but in a boom that is not an impossibility. Of course if he had started with £20,000, the consequence of taking 40% profits would be rather more dramatic, and after two years his capital would have grown to £1.1 million. What we think this demonstrates is that if one is active when the market is right then it is not necessary to stumble across a multiple bagger like Poseidon to make money. Unfortunately, greed has been the downfall of many investors in the mining sector, and although we appreciate the advice that at one and the same time an investor in mining should be both aggressive and careful, it may be difficult to square.

A portfolio of large or small stocks?

Following on, in terms of stock picking one of the bigger issues covered has been whether smaller investors should go for the handful of global mining giants with their spread of interests, or instead concentrate on identifying promising situations in the medium sized mining and smaller exploration companies categories where the beta is much higher. There is an issue of management here amongst the more speculative smaller stocks which I addressed at some length, but the balanced approach would lead to a core of large stocks with a group of carefully chosen and closely watched smaller situations to provide the performance. However, those who have confidence that they have grasped the sector's fundamentals and foibles will probably want to chance their luck on following the smaller companies, where the outperformance will undoubtedly be found in a mining bull market. Investors will also have to factor in the sector's M&A activity which has bubbled up in the last few years and led to considerable consolidation in small, medium and large miners.

It's a global industry, but still with national problems

We have also put the mining sector's global image under the microscope in order to assess the relative attractions of mining markets from a geopolitical viewpoint. Whilst all the main markets which have strong mining sectors have equally sound trading and settlement procedures these days, each of them has problems on a macro level. South Africa has the black empowerment issue to tackle, Canada has a strong environmental lobby and Australia has the problem of native title. Some like the UK are more expensive to trade in than their peer markets.

We have also sought to give readers an idea of the fun that the mining sector can provide investors. This acts as something of a counterweight to the serious need for mining investors to be well informed because, in some contrast to other sectors, mining can still be seen as a Cinderella sector by some mainstream media and is thus often still ignored by them.

The metals cycle

Importantly though, investors must not lose sight of the fact that the mining sector has its own macro driver – metals. The mining share cycle is driven by the metals cycle, a cycle which itself is influenced by a mix of metal price and sales volume. But on occasions mining can throw up a situation where the discovery of a new mineral province leads to sustained stock market activity despite a poor outlook for the metal/mineral involved – the discovery of diamonds in Canada in the mid 90s was an example of this. This means that in a mining downturn not all the sector needs to be in the same doldrums as the metals market. It also needs to be appreciated that mining shares may become strong buys long before the metals cycle turns up, because the sector's sometimes extreme volatility can lead to substantial overshoot on the downside (as well as on the upside of course).

The issue of what metal to follow obviously has a direct impact on stock choice and we have spent some time looking at a wide range of metals and assessing their key characteristics. Sentiment in the mining sector is often driven by gold, but copper, nickel and platinum are increasingly important and attract strong investor interest. Whilst it can also be argued that minor metals have potential, much greater care has to be exercised in assessing the investment merits of an occasional high-flyer like tantalum as opposed to a major long-term growth metal such as nickel. Uranium, which since 2004 has been in a huge upswing, is another example.

We also live in an increasingly regulated securities environment, so the old method of seeking illumination on investment issues by tapping insider knowledge unfortunately may no longer be safe or wise from a legal point of view. Nonetheless an early steer on a metal's prospects need not necessarily be illegal and may often be nothing more than a perceptive observation by someone knowledgeable about the sector. The huge late 90s boom in mobile phones provided a window for tantalum miners and explorers, and some investors had early warning of the link, which they were able to profit from.

Information sources and the decline of stockbroking expertise

On the more prosaic subject of where sector information is to be found and how an investor values mining situations, I can provide a clear lead on the former but unfortunately only a tentative one on the latter. One thing that is clear in the observation of information sources is that the broking community is often of limited help, although the number of mining specialists in London is now rising again as the number of mining companies listing in the City continues to increase. However, these specialists are discouraged from talking to private investors, and some of the larger investment banks do not encourage them to speak to the smaller institutions either. The average private client adviser in the UK then has only limited knowledge about mining and may therefore not encourage client interest in the sector. Fortunately the expansion of the internet has led to the creation of a large body of constantly updated information, and as I have said before the mining sector is well served in this area.

Learning the lessons of history

We have taken some time in these pages to outline what are arguably the two greatest mining market events of the last thirty or so years – the Australian mining boom and the Bre-X scam. These two episodes are entertaining yarns in their own right, but they also have lessons for those interested in participating aggressively in the mining sector in the future. Stock market history is scattered around with other booms and scams, some quite recent, others far away in time. What we are absolutely clear about is that new mining booms come and go, and learning the lessons of Bre-X or the Aussie boom will be enormously helpful in maximising profits. Perhaps they may even be able to be put to work in avoiding being drowned when the current uranium bubble finally bursts!

The last glass of champagne

Finally, we return to the subject of the mining sector as fun. The world of securities is a highly regulated place these days and the pressure of the compliance regime found in most brokers tends to drain the spirits of the industry's practitioners. The investor, however, is not similarly constrained, and, within reason, can pursue a developing mining boom with hedonistic abandon.

When the mining sector runs, as it has over the past two or three years, it can be an awesome sight and the excitement generated can be every bit as seductive and heady as that which enveloped markets during the internet boom. Many of the promoters are larger than life and even though they can exude great charm, they should come with storm warnings prominently displayed. However, their participation only adds to the fun.

Of course, as I have warned, parties do end and midnight does strike. It is best to be gone before that, leaving the last glass of champagne to someone else, returning to one's mining core to enjoy a few warm memories and await the next call to action.

Appendices

UK listed mining companies

See the following tables

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
African Consolidated Resources PLC	AIM	AFCR	GB00B142P698	Gold Mining	40	30/6/06	www.acrplc.com
African Diamonds PLC	AIM	AFD	GB0033110999	Diamonds & Gemstones	63	14/7/03	www.afdiamonds.com
African Eagle Resources PLC	AIM	AFE	GB0003394813	Gold Mining	18	25/6/03	www.africaneagle.co.uk
African Minerals Ltd	AIM	AMI	BMG0114P1005	General Mining			
Alba Mineral Resources PLC	AIM	ALBA	GB00B06KBB18	Gold Mining	2	4/4/05	www.albamineralresources.com
Albidon Ltd	AIM	ALD	AU000000ALB8	General Mining			
Alexander Mining PLC	AIM	AXM	GB00B06K1665	General Mining	11	4/4/05	www.alexandermining.com
Allied Gold Ltd	AIM	AGLD	AU000000ALD4	Gold Mining			
Altona Resources PLC	AIM	ANR	GB00B06GJT32	General Mining	16	10/3/05	www.altonaresources.com
Anglesey Mining PLC	Full	AYM	GB0000320472	General Mining	29	6/6/88	www.angleseymining.co.uk
Anglo American PLC	Full	AAL	GB00B1XZS820	General Mining	45,495	24/5/99	www.angloamerican.co.uk
Anglo Asian Mining PLC	AIM	AAZ	GB00B0C18177	General Mining	10	29/7/05	www.aamining.com
Anglo Pacific Group PLC	Full	APF	GB0006449366	General Mining	178	30/12/96	www.anglopacificgroup.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Angus & Ross PLC	AIM	AGU	GB0009348862	Gold Mining	21	28/8/01	www.angusandross.com
Antofagasta PLC	Full	ANTO	GB0000456144	General Mining	8,183	5/7/82	www.antofagasta.co.uk
Aquarius Platinum Ltd	Full	AQP	BMG0440M1284	Platinum & Precious Metals	2,104	17/7/02	www.aquariusplatinum.com
Archipelago Resources PLC	AIM	AR.	GB0033551721	Gold Mining	48	9/9/03	www.archipelagoresources.co.uk
Arian Silver Corporation	AIM	AGQ	VGG0472G1063	Platinum & Precious Metals			
Ariana Resources PLC	AIM	AAU	GB00B085SD50	Gold Mining	3	28/7/05	www.arianaresources.com
Aricom PLC	Full	ORE	GB0033990283	General Mining	953	31/12/03	www.aricom.plc.uk
ATH Resources PLC	AIM	ATH	GB00B013H730	Coal	86	11/6/04	www.ath.co.uk
Aurum Mining PLC	AIM	AUR	GB00B00T3528	Gold Mining	46	7/5/04	www.aurummining.net
Avocet Mining PLC	AIM	AVM	GB0000663038	Gold Mining	239	26/7/02	www.avocet.co.uk
Baobab Resources PLC	AIM	BAO	GB00B19HQ991	General Mining	8	1/2/07	www.baobabresources.com
Berkeley Resources Ltd	AIM	BKY	AU000000BKY0	General Mining			
Bezant Resources PLC	AIM	BZT	GB00B1CKQD97	Gold Mining	34	6/2/95	www.bezantresources.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
BHP Billiton PLC	Full	BLT	GB0000566504	General Mining	37,078	28/7/97	www.bhpbilliton.com
Bisichi Mining PLC	Full	BISI	GB0001012045	Coal	31	14/3/48	www.bisichi.co.uk
Braemore Resources PLC	AIM	BRR	GB00B06GJQ01	General Mining	90	10/3/05	www.braemoreresources.com
Brazilian Diamonds Ltd	AIM	BDY	CA1058741010	General Mining			
Caledon Resources PLC	AIM	CDN	GB00B1GJZT14	Gold Mining	94	7/12/00	www.caledonresources.com
Caledonia Mining Corp	AIM	CMCL	CA12932K1030	General Mining			
Cambrian Mining PLC	AIM	CBM	GB0031630527	General Mining	74	4/8/03	www.cambrianmining.com
Cambridge Mineral Resources PLC	AIM	CMR	GB0001826303	General Mining	5	26/7/00	www.cambmin.co.uk
Cape Diamonds PLC	AIM	CAPE	GB00B137SL17	Diamonds & Gemstones	8	26/5/06	www.capediamonds.com
Carnegie Minerals PLC	AIM	CME	GB00B19G8Q73	General Mining	2	14/8/06	www.carnegiemins.com
Centamin Egypt	AIM	CEY	AU000000CNT2	Gold Mining			

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Central African Mining & Exploration Company PLC	AIM	CFM	GB0031253643	General Mining	692	9/10/02	www.investors.camec-plc.com
Central China Goldfields PLC	AIM	GGG	GB00B06JK880	Gold Mining	7	30/3/05	www.ccgoldfields.com
Central Rand Gold Ltd	Full	CRND	GG00B24HM601	Gold Mining	271	8/11/07	www.centralrandgold.com
Chaarat Gold Holdings Ltd	AIM	CGH	VGG203461055	Gold Mining			
China Goldmines PLC	AIM	CGM	GB00B0T4LB03	Gold Mining	58	7/2/06	www.chinagoldmines.com
Chromex Mining PLC	AIM	CHX	GB00B16QP362	General Mining	14	6/9/06	www.chromexmining.co.uk
Cluff Gold PLC	AIM	CLF	GB00B04M1L91	Gold Mining	86	15/12/04	www.cluffgold.com
Coal International PLC	AIM	CLN	GB00B06YVB34	General Mining	25	28/4/05	www.coal-international.com
Coal of Africa Ltd	AIM	CZA	AU000000CZA6	General Mining			

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Connemara Mining Company PLC	AIM	CON	IE00B2357X72	General Mining	5	31/7/07	www.connemaramc.com
Conroy Diamonds & Gold PLC	AIM	CDG	IE0002163354	Gold Mining	3	31/5/00	www.conroydiamondsandgold.com
Consolidated Minerals Ltd	AIM	CNM	AU000000CSM6	General Mining			
Copper Resources Corp	AIM	CRC	VGG2421F1062	General Mining			
Diamondcorp PLC	AIM	DCP	GB00B183ZC46	Diamonds & Gemstones	32	1/2/07	www.diamondcorp.plc.uk
Diamonex Ltd	Full	DON	AU000000DON1	Diamonds & Gemstones			
Dwyka Diamonds	AIM	DWY	AU000000DWY1	General Mining			
Eastern Platinum Ltd	AIM	ELR	CA2768551038	General Mining			
EMED Mining Public Ltd	AIM	EMED	CY0000100319	Gold Mining			
Energybuild Group PLC	AIM	EBG	GB00B1Z47571	Coal	26	6/8/07	www.energybuild.co.uk
Eurasia Mining PLC	AIM	EUA	GB0003230421	Platinum & Precious Metals	5	2/10/96	www.eurasiamining.co.uk

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Eurasian Natural Resources Corporation PLC	Full	ENRC	GB00B29BCK10	General Mining	13,895	12/12/07	www.enrc.com
Eurogold Ltd	AIM	EUG	AU000000EUG0	Gold Mining			
European Goldfields Ltd	AIM	EGU	CA2987741006	General Mining			
European Minerals Corp	AIM	EUM	VGG3192Y1007	General Mining			
European Nickel PLC	AIM	ENK	GB0034265404	General Mining	152	31/3/04	www.enickel.co.uk
Everfor Diamonds PLC	AIM	EVE	GB00B01GW445	Diamonds & Gemstones	2	6/4/06	www.everfor.com
Falkland Gold & Minerals Ltd	AIM	FGML	FK0020041496	Gold Mining			
Ferrexpo PLC	Full	FXPO	GB00B1XH2C03	General Mining	2,121	20/6/07	www.ferrexpo.com
Finders Resources Ltd	AIM	FND	AU000000FND9	General Mining			
Firestone Diamonds PLC	AIM	FDI	GB0003915336	Diamonds & Gemstones	93	14/8/98	www.firestonediamonds.com
First Quantum Minerals LD	Full	FQM	CA3359341052	General Mining			
Frontier Mining	AIM	FML	USU314441093	General Mining			

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Galantas Gold Corporation	AIM	GAL	CA36315W1032	Gold Mining			
GCM Resources PLC	AIM	GCM	GB00B00KV284	Coal	61	19/4/04	www.gcmplc.com
Gem Diamonds Ltd	Full	GEMD	VGG379591065	Diamonds & Gemstones	562	19/2/07	www.gemdiamonds.com
Gemfields Resources PLC	AIM	GEM	GB00B0HX1083	Diamonds & Gemstones	37	28/11/05	www.gemfields.co.uk
Gippsland Ltd	AIM	GIP	AU000000GIP1	General Mining			
Gladstone Pacific Nickel Ltd	AIM	GPN	AU0000XINAC5	General Mining			
Glencar Mining PLC	AIM	GEX	IE0003725383	Gold Mining	18	1/1/83	www.glencarmining.ie
GMA Resources PLC	AIM	GMA	GB0032875873	Gold Mining	50	14/5/03	www.gmaresources.plc.uk
Gold Bullion Securities	Full	GBS	GB00B00FHZ82	Gold Mining			
Goldplat PLC	AIM	GDP	GB00B0HCWM45	Gold Mining	16	26/7/06	www.goldplat.com
GoldStone Resources Ltd	AIM	GRL	GB0034388354	Gold Mining	2	25/3/04	www.goldstoneresources.com
Greatland Gold PLC	AIM	GGP	GB00B15XDH89	Gold Mining	3	3/7/06	www.greatlandgold.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Greystar Resources Ltd	AIM	GSL	CA3979132030	General Mining			
Griffin Mining	AIM	GFM	BMG319201049	General Mining			
Hambledon Mining PLC	AIM	HMB	GB00B015PT76	Gold Mining	75	10/6/04	www.hambledon-mining.com
Herencia Resources PLC	AIM	HER	GB00B069DV22	General Mining	8	22/2/05	www.herenciaresources.com
Hidefield Gold PLC	AIM	HIF	GB0003644506	Gold Mining	11	7/12/00	www.hidefieldgold.com
Highland Gold Mining Ltd	AIM	HGM	GB0032360173	Gold Mining	652	17/12/02	www.highlandgold.com
Hochschild Mining PLC	Full	HOC	GB00B1FW5029	Platinum & Precious Metals	1,342	8/11/06	www.hochschildmining.com
Horizonte Minerals PLC	AIM	HZM	GB00B11DNM70	Gold Mining	5	5/5/06	www.horizonteminerals.com
JSC Polymetal	Full	PMTL	US7317892021	Platinum & Precious Metals			
Jubilee Platinum PLC	AIM	JLP	GB0031852162	Platinum & Precious Metals	74	31/7/02	www.jubileeplatinum.com
Kalahari Minerals PLC	AIM	KAH	GB00B117S132	General Mining	42	21/3/06	www.kalahari-minerals.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Kalimantan Gold Corporation Ltd	AIM	KLG	BM4834061049	Gold Mining			
Karelian Diamond Resources PLC	AIM	KDR	IE00B01ZSK94	Diamonds & Gemstones	3	1/9/05	www.kareliandiamondresources.com
Kazakhmys PLC	Full	KAZ	GB00B0HZPV38	General Mining	7,757	12/10/05	www.kazakhmys.com
KEFI Minerals PLC	AIM	KEFI	GB00B1HNYB75	General Mining	4	18/12/06	www.kefi-minerals.com
Kenmare Resources PLC	Full	KMR	IE0004879486	General Mining	336	17/11/94	www.kenmareresources.com
KimCor Diamonds PLC	AIM	KIM	GB00B0TNHV95	Diamonds & Gemstones	13	6/3/06	www.kimcordiamonds.com
Kirkland Lake Gold Inc	AIM	KGI	CA49740P1062	Gold Mining			
Kopane Diamond Developments PLC	AIM	KDD	GB0002998978	Diamonds & Gemstones	14	11/12/00	www.kopanediamonds.com
Kryso Resources PLC	AIM	KYS	GB00B03WBP45	Gold Mining	12	2/12/04	www.kryso.com
Landore Resources Ltd	AIM	LND	GB00B06VJ325	Gold Mining	23	6/4/05	www.landore.com
Lapp Plats PLC	AIM	LPP	GB0034353531	General Mining	4	25/5/05	www.lapp-plats.com
Latitude Resources PLC	AIM	LTR	GB0009587568	General Mining	10	27/7/05	www.latituderesources.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Leyshon Resources Ltd	AIM	LRL	AU000000LRL1	General Mining			
Lithic Metals and Energy Ltd	AIM	LMY	BMG5504H1051	General Mining			
Lonmin PLC	Full	LMI	GB0031192486	Platinum & Precious Metals	5,466	22/9/61	www.lonmin.com
Maghreb Minerals PLC	AIM	MMS	GB00B046T172	General Mining	4	23/12/04	www.maghrebminerals.co.uk
Mano River Resources Inc	AIM	MANA	CA5640071026	General Mining			
Marakand Minerals Ltd	AIM	MKD	GB0033883835	General Mining			
Mariana Resources Ltd	AIM	MARL	GB00B12GJ720	Gold Mining	5	19/5/06	www.marianaresources.com
Medoro Resources	AIM	MRL	CA58503R2090	Gold Mining			
Medusa Mining Ltd	AIM	MML	AU000000MML0	Gold Mining			
Mercator Gold PLC	AIM	MCR	GB00B0P4LQ95	Gold Mining	49	8/10/04	www.mercatorgold.com
Metals Exploration PLC	AIM	MTL	GB00B0394F60	General Mining	25	22/10/04	www.metalsexploration.com
Metorex Ltd	Full	MTX	ZAE000022745	General Mining			
Minco PLC	AIM	MIO	IE0004678326	Platinum & Precious Metals	8	29/1/01	www.mincoplc.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Mincorp PLC	AIM	MOP	GB00B05Q9X89	General Mining	3	28/1/05	mincorpplc.investis.com
Minera IRL Ltd	AIM	MIRL	JE00B1HNYF12	Gold Mining	28	12/4/07	www.minera-irl.com
Minerals Securities PLC	AIM	MXX	VGG614341094	Gold Mining			
Minerva Resources PLC	AIM	MVA	GB0033826206	Platinum & Precious Metals	5	2/2/04	www.minervaresources.com
Minmet PLC	AIM	MNT	IE00B1KDSD45	General Mining	8	15/12/05	www.minmet.ie
Monterrico Metals PLC	AIM	MNA	GB0031695009	General Mining	82	21/6/02	www.monterrico.com
Monto Minerals Ltd	AIM	MON	AU000000MOO0	General Mining			
Moto Goldmines Ltd	AIM	MOE	CA61981U1084	Gold Mining			
Moydow Mines International Inc	AIM	MOY	CA62472V1004	General Mining			
Murchison United	AIM	MUU	AU000000MUR0	General Mining			
Mwana Africa PLC	AIM	MWA	GB00B0GN3470	Gold Mining	139	29/9/95	www.mwanaafrica.com
Namibian Resources PLC	AIM	NBR	GB0034380625	Diamonds & Gemstones	5	24/3/04	www.namibianresources.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Nautilus Minerals Inc	AIM	NUS	CA6390971043	General Mining			
Neptune Minerals PLC	AIM	NPM	GB00B0LHS387	General Mining	10	10/10/05	www.neptuneminerals.com
Norseman Gold PLC	AIM	NGL	GB00B2N7FW85	Gold Mining	30	23/10/06	www.norsemangoldplc.com
North River Resources PLC	AIM	NRRP	GB00B1GCQJ71	General Mining	3	27/12/06	www.northriverresources.com
Noventa Ltd	AIM	NVTA	JE00B1RPM978	General Mining	50	20/3/07	www.noventa.net
Oriel Resources PLC	AIM	ORI	GB0034246743	General Mining	739	11/3/04	www.orielresources.com
Ormonde Mining PLC	AIM	ORM	IE0006627891	Gold Mining	16	20/2/96	www.ormondemining.com
Ovoca Gold PLC	AIM	OVG	IE0006649010	General Mining	59	30/6/05	www.ovocagold.com
Oxus Gold PLC	AIM	OXS	GB0030632714	Gold Mining	101	4/7/01	www.oxusgold.co.uk
Pan African Resources PLC	AIM	PAF	GB0004300496	Gold Mining	76	19/5/00	www.panafricanresources.com
Pan Pacific Aggregates PLC	AIM	PPA	GB00B0M9M645	General Mining	1	16/12/05	www.panagg.com
Pangea DiamondFields PLC	AIM	PDF	GB00B197TQ75	Diamonds & Gemstones	65	17/10/06	www.pangeadiamondfields.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Pangea DiamondFields PLC	AIM	PDF	GB00B197TQ75	Diamonds & Gemstones	65	17/10/06	www.pangeadiamondfields.com
Patagonia Gold PLC	AIM	PGD	GB0003049409	Gold Mining	37	5/3/03	www.patagoniagold.com
Peninsular Gold Ltd	AIM	PGL	GB00B09TKL88	Gold Mining	23	23/6/05	www.peninsulargold.com
Persian Gold PLC	AIM	PNG	GB00B09WLX62	Gold Mining	9	30/6/05	www.persiangoldplc.com
Peter Hambro Mining PLC	AIM	POG	GB0031544546	Gold Mining	1,163	29/4/02	www.peterhambro.com
Petmin Ltd	AIM	PTMN	ZAE000076014	General Mining			
Petra Diamonds Ltd	AIM	PDL	BMG702781094	Diamonds & Gemstones	223	17/6/05	petradiamonds.com
Platinum Australia Ltd	AIM	PLAA	AU000000PLA8	General Mining			
Platinum Mining Corporation of India PLC	AIM	PMCI	GB00B06T2F98	Platinum & Precious Metals	30	19/4/05	www.pmciplc.com
Platmin Ltd	AIM	PPN	CA72765Y1097	Platinum & Precious Metals			
Rambler Metals and Mining PLC	AIM	RMM	GB00B06Y3F14	General Mining	30	8/4/05	www.ramblermines.com
Randgold Resources Ltd	Full	RRS	GB00B01C3S32	Gold Mining	2,102	1/7/97	www.randgoldresources.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Red Rock Resources PLC	AIM	RRR	GB00B0CQLF79	General Mining	8	29/7/05	www.rrrplc.com
Regency Mines PLC	AIM	RGM	GB00B067NB67	General Mining	8	22/2/05	www.regency-mines.com
Ridge Mining PLC	AIM	RDG	GB0004871082	Platinum & Precious Metals	119	5/5/00	www.ridgemining.com
Rio Tinto PLC	Full	RIO	GB0007188757	General Mining	57,937	1/11/73	www.riotinto.com
River Diamonds PLC	AIM	RVD	GB00B00SV774	General Mining	48	26/8/04	www.riverdiamonds.co.uk
Rusina Mining NL	AIM	RMLA	AU000000RML9	General Mining			
Sanatana Diamonds Inc	AIM	SAN	CA79957P1018	General Mining			
Serabi Mining PLC	AIM	SRB	GB00B074J639	Gold Mining	27	10/5/05	www.serabimining.com
Shanta Gold Ltd	AIM	SHG	GB00B0CGR828	Gold Mining	12	11/7/05	www.shantagold.com
Sirius Exploration PLC	AIM	SXX	GB00B0DG3H29	General Mining	4	1/8/05	www.siriusexploration.com
Solana Resources Ltd	AIM	SORL	CA8341281001	General Mining			
Solomon Gold PLC	AIM	SOLG	GB00B0WD0R35	Gold Mining	8	10/2/06	www.solomongold.com
South China Resources PLC	AIM	SCR	GB00B0704D34	General Mining	3	18/4/05	www.southchinaresources.com
Strategic Natural Resources PLC	AIM	SNRP	GB00B1VQ5F36	Coal	23	7/8/07	www.snrplc.co.uk

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
Stratex International PLC	AIM	STI	GB00B0T29327	General Mining	20	4/1/06	www.stratexinternational.com
Sunrise Diamonds PLC	AIM	SDS	GB00B075Z681	Diamonds & Gemstones	2	6/6/05	www.sunrisediamonds.com
Sylvania Resources Ltd	AIM	SLV	AU000000SLV8	Platinum & Precious Metals			
Tanzanite One Ltd	AIM	TNZ	BMG8672E1021	General Mining			
Target Resources PLC	AIM	TGT	GB00B15CCR83	Diamonds & Gemstones	19	12/7/06	www.target-resources.co.uk
Tertiary Minerals PLC	AIM	TYM	GB0008854563	General Mining	4	18/11/99	www.tertiaryminerals.com
Thistle Mining Inc	AIM	TMG	CA88431N3013	Gold Mining			
Thor Mining PLC	AIM	THR	GB00B1DXJY95	General Mining	9	29/6/05	www.thormining.com
Tianshan Goldfields Ltd	AIM	TGF	AU000000TGF9	Gold Mining			
Titanium Resources Group Ltd	AIM	TXR	VGG889921059	General Mining			
Tower Resources PLC	AIM	TRP	GB00B05KQ069	General Mining	18	13/1/05	www.towerresources.co.uk
Trans-Siberian Gold PLC	AIM	TSG	GB0033756866	Gold Mining	12	25/11/03	www.trans-siberiangold.com
Triple Plate Junction PLC	AIM	TPJ	GB0034039965	Gold Mining	18	27/6/00	www.tripleplatejunction.com
UK Coal PLC	Full	UKC	GB0007190720	Coal	734	7/6/93	www.ukcoal.com

Company	Listing	EPIC	ISIN	Sub-Sector	Capital (£m)	Float date	Website
UMC Energy PLC	AIM	UEP	GB00B0FRLC45	General Mining	3	2/8/05	www.umc-energy.com
Union Resources Ltd	AIM	URL	AU000000UCL4	General Mining			
Uruguay Mineral Exploration INC COM	AIM	UGY	CA9169091043	General Mining			
Van Dieman Mines PLC	AIM	VDM	GB00B03HFG82	General Mining	20	23/11/04	www.vandiemanmines.com
Vane Minerals PLC	AIM	VML	GB00B013M672	General Mining	26	2/6/04	www.vaneminerals.com
Vedanta Resources PLC	Full	VED	GB0033277061	General Mining	6,815	10/12/03	www.vedantaresources.com
Weatherly International PLC	AIM	WTI	GB00B15PVN63	General Mining	100	30/5/00	www.weatherlyplc.com
West African Diamonds PLC	AIM	WAD	GB00B1CQN147	Diamonds & Gemstones	10	5/1/07	www.westafdiamonds.com
Western Canadian Coal Inc	AIM	WTN	CA9578601093	General Mining			
Xceldiam Ltd	AIM	XLD	BMG316011003	Diamonds & Gemstones	2	16/11/05	www.xceldiamgroup.com
Xstrata PLC	Full	XTA	GB0031411001	General Mining	38,872	25/3/02	www.xstrata.com
Yamana Gold Inc	Full	YAU	CA98462Y1007	Gold Mining			
Zambezi Resources Ltd	AIM	ZRL	BMG988411028	Gold Mining			
Zeehan Zinc Ltd	AIM	ZZL	AU0000XINEA1	General Mining			
ZincOx Resources PLC	AIM	ZOX	GB0031124638	General Mining	124	10/12/01	www.zincox.com

FT Annual Reports Service

Annual reports for the companies listed below can be ordered for free through the FT service.

ACR PLC	Highland Gold Mining Ltd
African Diamonds PLC	Horizonte Minerals PLC
Albidon Ltd	Landore Resources PLC
Anglesey Mining PLC	Lonmin PLC
Anglo Asian Mining PLC	Mercator Gold PLC
Anglo Pacific Group PLC	MINCO PLC
Angus & Ross PLC	Monterrico Metals PLC
Arian Silver Corp.	Mwana Africa PLC
Ariana Resources PLC	Oriel Resources PLC
Ascent Resources PLC	OxusGold PLC
ATH Resources PLC	Palmaris Capital PLC
Bisichi Mining PLC	Persian Gold PLC
Cambrian Mining PLC	Randgold Resources PLC
Cambridge Mineral Resources PLC	Rio Tinto PLC
Eastern Platinum Ltd	Serabi Mining PLC
EMED Mining Public Ltd	Target Resources PLC
Emgold Mining Corp	UK Coal PLC
European Minerals Corp	UraMin Inc
European Nickel	Vallourec
Eurasia Mining PLC	Weatherly International PLC
Firestone Diamonds PLC	Xstrata PLC
Glencar Mining PLC	Yamana Gold Inc
Griffin Mining Limited	ZincOx Resources PLC

Glossary

The terms used below in the glossary and their description may differ slightly from other, particularly professional, interpretations. The difference is deliberate and often is a result of wanting to avoid jargon or opaqueness.

Arbitrage	The purchase of a security in one market and its often simultaneous sale in another to exploit a price difference between the two markets
Assay	To test/analyse an ore or mineral to determine the amount and composition of contained metals
Base metals	The more common chemically active metals such as copper, lead, zinc, tin and nickel
Beta	The volatility (high – greater, low – lesser) of a share relative to the market or its sector
Bonanza gold	The term used to describe extremely rich gold mineralisation
Bulk minerals	Minerals and metals mined in huge quantities such as iron ore, coal and bauxite, which usually have a relatively low unit value
Bullion	Gold or silver bars
By-product metal	The residual, i.e not prime, metals mined alongside the 'main' metal in a multi-metal deposit
Carat	The unit of weight for gemstones – one carat weighs 200mgs. Also the word describing the measurement of the purity of gold in a gold item, thus 24 carat is pure gold and 9 carat is 36% gold
Certified gold	Gold metal purchased for investment where the holder is given a certificate outlining the gold held to his name, such gold is not specifically identifiable
Claim	An area legally licenced to an entity to be explored for minerals
Closeology	The concept in exploration that leads to the acquisition of mineral leases close to a major new minerals discovery
Core samples	Samples of rock/ore produced by diamond drilling
Costs	Operating – mining and treatment Central – administration and selling Financial – interest payments and depreciation

Derivatives	Futures and options contracts to sell metals at a future date for an agreed price
Diamond	Industrial – low value stones used primarily in abrasives or cutting tools due to hardness Gem – used in jewellery due to high quality (clarity and colour) and value
Dollar premium	The percentage cost, above the official sterling exchange rate, of investment currency for overseas asset purchases by UK residents before the abandonment of UK exchange controls in 1979
Drift mining	The technique whereby a decline roadway is sunk into an underground orebody allowing mechanical extraction of the ore
Forward metal price	The price of a metal sold forward for delivery at a future date
Gearing	The application of increased resources (usually borrowings) to enhance the return on a project
Gold bugs	Investors and commentators with a, usually, lifetime belief in the key importance of gold as a reserve/financial asset
Gold reserves	The central banks' holdings of gold as monetary metal in their foreign currency and gold reserves
Grade	The percentage amount of metal in an ore sample or drill core
Hedging	Primarily refers to the process of fixing a sale price for gold, and occasionally other metals, to protect against untoward price movements
Industrial minerals	Minerals such as sulphur, beach sands (zirconium) and borax which are used in industrial processes like chemical manufacturing
IPO	An Initial Public Offering of stock to the market in a new listed company
JORC	Australia's Joint Ore Reserves Committee. JORC lays down strict definitions of what constitutes reserves and resources and how they are to calculated and reported. It also lays down guidelines for reporting exploration results. Considered to be the world's most rigorous authority in the field
Kimberlite pipe	An orebody often shaped like a flute or pipe which can contain diamonds
Laterite ore	Ore occurring in the form of soil residue containing secondary oxides of metal, often associated with nickel

Mineral deposit	Economic – a deposit whose grade, cost and financing structure indicates that it could be developed profitably Uneconomic – a deposit that currently cannot be developed profitably
Monetary metal	Gold and silver used as money
Native title	The claim by indigenous Australians that certain areas have been used by them historically
Open – cast, cut or pit	A mine where the orebody is shallow enough to be mined without sinking a shaft or drive to get at the ore
Ore	Naturally occurring material containing extractable metals
Physical delivery	The actual delivery of 'live' metal to consumers
Placing	Usually the sale of stock to a limited number of professional investors who may well not be current shareholders of the placing company
Prospectivity	The level of expectation of success or otherwise in the exploration for and development of mineral deposits
Reserves	Measured economic ore forming the basis for a mining plan
Resources	Mineralised part of an orebody which requires more drilling to convert it to mineable reserves
Royalties	A financial impost on the value of mine turnover or profits collected by central/local government or by private mine royalty owners
Salting	The (illegal) process by which 'foreign' metal is added to ore samples or drill core to enhance its value when it is assayed
Spot metal price	The daily real-time price of a metal as determined by the relevant metal trading market
Strike length	The distance and direction along which drilling results have established mineralisation
Suphide ore	Ore where sulphur is combined with one or more metals
Surface sample	A sample taken from a potentially mineralised area by hand for analysing as to whether follow up drilling should be undertaken
Use it or lose it	The concept in South Africa of requiring mining companies holding long leases on undeveloped mineral areas to either develop them or surrender them for issuance to other more willing groups

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